

**A Unit of Study  
for Grades 3–5 and 6–8**

 NATIONAL GEOGRAPHIC

# Treasures of the Earth

**DISCOVER CLUES TO THE PAST**

  
CHILDREN'S  
MUSEUM  
INDIANAPOLIS



## ACKNOWLEDGEMENTS

National Geographic Treasures of the Earth is a partnership between The Children's Museum of Indianapolis and the National Geographic Society, Dr. Zahi Hawass and Egypt's Supreme Council of Antiquities, China's Shanxi Provincial Institute for Archaeological Research and Xi'an Municipal Museum, and Indiana University Bloomington and its Department of Underwater Science.

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The Children's Museum of Indianapolis is a nonprofit institution dedicated to creating extraordinary learning experiences across the arts, sciences, and humanities that have the power to transform the lives of children and families. It is the largest children's museum in the world and serves more than one million people across Indiana as well as visitors from other states and nations.

The museum provides special programs and experiences for students as well as teaching materials and professional development opportunities for teachers. To plan a visit or learn more about educational programs and resources, visit the Teacher section of the museum's website at [childrensmuseum.org](http://childrensmuseum.org).

# Treasures of the Earth

**Introduction** ..... 4

**Introductory Experiences: Archaeology—Tools of Discovery** ..... 8

Experience 1—What Is an Archaeologist? ..... 9

Experience 2—Looking Back through Time ..... 12



**Lesson 1: Egyptian Treasures** ..... 16

**Pre-Visit Experiences** ..... 17

Experience 1—Tomb Mapping ..... 19

Experience 2—Write Like an Egyptian ..... 23

Experience 3—Assessment: Debate: To Visit or Not to Visit ..... 27

**Lesson 2: Chinese Treasures** ..... 33

**Pre-Visit Experiences** ..... 34

Experience 1—Where in the World is the Terra Cotta Army? ..... 35

Experience 2—Building an Army ..... 38

Experience 3—Assessment: The Important Things in Life ..... 43



**Lesson 3: Treasures Under the Sea** ..... 55

**Pre-Visit Experiences** ..... 56

Experience 1—Excavating and Mapping Under Water ..... 57

Experience 2—Treasures in the Rough ..... 61

Experience 3—Assessment: Everyday Treasures ..... 64

**Culminating Experience and Assessment—Think Like an Archaeologist** ..... 68

**Glossary** ..... 77

**Resources** ..... 78



# Treasures of the Earth

## Students will learn that

- archaeologists study how people lived in the past by examining what they left behind;
- there are different kinds of archaeological sites;
- each site has specific strategies and tools for excavating artifacts and piecing together stories of the past; and
- investigations carried out by archaeologists in their laboratories help to uncover clues about the people and cultures of the past.

## The Exhibition

Archaeology has long inspired and fueled the imaginations of generations of children and adults alike. Archaeology uncovers the unknown and answers the questions that cannot otherwise be answered. Many cultures did not leave a written record; many others left an incomplete record, telling only some stories of certain people or writing only partial versions of events. Archaeology helps to fill in those gaps. The work of archaeologists gives a voice to the people who lived and died long ago and provides people today a richer, fuller understanding of what came before us. *National Geographic Treasures of the Earth* will introduce students to the work of archaeologists through the presentation of three immersive archaeological environments. Students will be able to explore the tomb of an Egyptian pharaoh; a terra cotta army in Shanxi Province, China; and an underwater shipwreck off the coast of the Dominican Republic. Students will approach the exhibit like real archaeologists, asking questions such as “Whose tomb is this?” “How do we know?” “Who built these warriors?” and “Whose ship was this?” Through the work of archaeologists, students will explore the questions and uncover the clues that help archaeologists reconstruct stories of the human past. Students will discover for themselves that the tomb belonged to



Workers painstakingly reassemble a warrior figure at the Qin Terra Cotta Army Museum in China.

© Louis Mazzatenta/National Geographic Stock

### Enduring Idea

Archaeology is the challenging search for clues about our past. It is more than a treasure hunt. Archaeology helps us piece together stories of the past by uncovering, investigating, interpreting, and preserving what people leave behind.

Seti I, the warriors were built by the First Emperor of China, and the wreck is likely the last ship of Captain Kidd.

### The Unit of Study

As a multidisciplinary field of study, archaeology offers the opportunity to investigate history, cultures, mathematics, chemistry, botany, biology, linguistics, and much more. As if working through a giant, never-ending puzzle, archaeologists continue seeking answers and asking new questions. Using all of the tools available, archaeologists collect clues and answer questions about what happened in the past.

In this unit of study, designed with layered experiences for Grades 3–5 and 6–8, students will become familiar with archaeology through a series of hands-on explorations. Throughout this unit students will learn to think like an archaeologist, asking questions, examining clues, and considering a variety of issues archaeologists must face. Students will also be exposed to information about the cultures that created the three archaeological sites featured in the exhibit in order to better prepare them for an on-site visit.



#### The Teacher Community of Inquiry:

Share your experiences using this unit of study with your colleagues through the museum’s online community dedicated exclusively to educators at [tcmteachers.org](http://tcmteachers.org). View student work and learn how to share your students’ work with others. Learn about up-coming opportunities for teachers and students at the museum. Share ideas and learn what other teachers have done to enhance their students’ experience at the museum. Visit [tcmteachers.org](http://tcmteachers.org) to become a part of the museum’s teacher community today.

### What’s Ahead?



Reuters

### Introduction

In the introductory experiences, students explore the main concepts of archaeology. What is archaeology? What do archaeologists do? How do archaeologists collect clues and use them to answer questions about past cultures and societies? Students will also learn that there are different kinds of archaeological sites and different techniques are used to investigate them.



Foto © Sandro Vannini

### Lesson 1

Students will learn about the tomb of an Egyptian pharaoh, Seti I, and some of the challenges faced by archaeologists in the investigation of this ancient site.



C. Blänsdorf, Technische Universität Muenchen, "China-Project"

### Lesson 2

Students will investigate the terra cotta army commissioned by the First Emperor of China to guard his tomb. Students will learn where the warriors were found, how they were made, and why they were buried in the Chinese countryside over 2,000 years ago.



Courtesy Indiana University

### Lesson 3

Excavating an underwater shipwreck poses unique challenges. Students will explore some of these challenges and how they affect what archaeologists can learn from shipwreck sites like Captain Kidd’s *Cara Merchant*.

## INTRODUCTION



### What Will Students Learn?

Unit learning experiences address national and state academic standards in Visual Arts, Language Arts, Math, Science, and Social Studies.



### What Will Students Be Able to Do?

#### Unit Goals



#### Students will

- ✓ Explain how archaeologists study what humans of the past left behind
- ✓ Identify key concepts that make archaeology unique
- ✓ Use maps to locate and learn about archaeological sites
- ✓ Use math skills to investigate and test their hypotheses
- ✓ Infer information about the past by studying what humans left behind
- ✓ Describe specific archaeology techniques required at different types of excavation sites
- ✓ Identify art work from three different cultures of the past
- ✓ Describe several significant artworks from ancient Egypt and early imperial China and speculate on their meaning to these cultures
- ✓ Create an artwork that communicates an idea of personal and community significance
- ✓ Apply all that they have learned about archaeology as they research and present a proposal for an expedition to solve an archaeological mystery



### The Children's Museum Website

Be sure to visit the museum's Website to learn more about the exhibit *National Geographic Treasures of the Earth*. Through the site you will be able to access a variety of resources, including the online learning module. Use the module as a pre-visit experience to introduce students to the exhibit and the study of archaeology. Students will learn more about the tools archaeologists use and how archaeological clues help to reveal the past. By completing this module, students can earn their *Apprentice Archaeologist Certificate*.

Also visit the Website, [childrensmuseum.org](http://childrensmuseum.org), to learn how to register for a field trip to the exhibit and how to include the in-depth archaeological experience for schools, *Challenges in Archaeology*.





## Getting Started

Let other teachers and school media specialists know that your class is planning a cross-disciplinary inquiry into archaeology as well as ancient Egypt, ancient China, and colonial trade and piracy on the high seas. In elementary classrooms, establish “investigation stations” with nonfiction books and other resources that teams can use to complete background research. Use books listed in the Resources section on page 78–81, along with other materials, to create four distinct investigation stations for each area of research: general archaeology, ancient Egypt, imperial China and underwater archaeology. Make sure that students can use a computer with Internet access. All students should use both print and electronic media to conduct research. Students should be encouraged to use all varieties of research material, including printed and electronic books as well as periodicals for the most up-to-date information. Help students at all levels understand that new discoveries are being made every day and new technologies are helping us to uncover and analyze more evidence about the past.



## Family Connections

Many families are fascinated by the topic of archaeology. Let them know that your class is using the unit of study as they prepare to visit the *National Geographic Treasures of the Earth* exhibit. Give them the museum Web addresses for this unit of study and the complementary Family Guide. This will help families reinforce the learning that takes place in both the classroom and the exhibit. Be sure to tell them that students will be viewing images and actual artifacts from the exhibit and looking for clues from the artifacts in the immersive environments to help them learn about the history of these sites. Some families

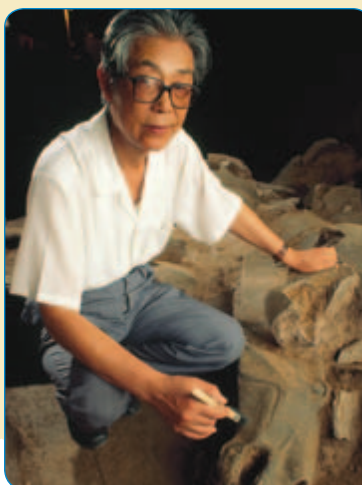
may have resources such as travel books and photos to share. After your visit, encourage families to return to The Children’s Museum and give students a chance to serve as tour guides and share what they have learned.

## Treasures Classroom Notebooks

Have students create notebooks to record their experiences and learning throughout the course of this unit of study. Students can write and draw about what they accomplish and collect their materials from graphic organizers and handouts in one place. Note-taking and journaling are particularly important skills for an archaeologist to master. Archaeologists must keep accurate accounts of their experiences in the field to help them remember all of the details of their excavation later, when it is time to analyze all of the data. Students may enjoy an opportunity to personalize their journals with decorations or their own art work. The notebooks allow them to record and reflect on their own learning. The teacher also can monitor individual work, carry out formative assessment, and correspond with students through the notebooks. The notebooks are an important aspect of student work that can be shared with parents during parent/teacher conferences and on other occasions.

## Archeology: Science of the Past

An archaeologist is a type of scientist who studies human cultures through the recovery, documentation, analysis, and interpretation of artifacts and related environments. Like other scientists, archaeologists begin an investigation by asking a question to direct their research. What are they looking for? How old is it? Archaeologists keep meticulous records of their excavations and then draw conclusions based on the evidence they uncover.



O. Louis Mazzatena/National Geographic Stock

## Archaeology—Tools of Discovery


Nearly everyone has heard of archaeologists, even if only in reference to fictional characters like Indiana Jones and Lara Croft. The word conjures up images of adventures in exotic lands and glittering treasures of gold, but these views of archaeology are largely fantasy. As entertaining as these myths can be, the reality of archaeology is far more fascinating.



Foto © Sandro Vainini

*A collection of artifacts uncovered in the mysterious tunnel in the tomb of Seti I.*

What is archaeology? Archaeology is the study of the human past through the material remains people left behind. An archaeologist is a scientist who searches for clues about the past by uncovering, investigating, interpreting, and preserving the things people left behind. Although many archaeologists do work in distant lands—Egypt, China, Mesopotamia, or the Belizean rainforest, to name but a few—they can also work in your own backyard. Wherever human beings live they leave traces behind, and archaeologists can use their tools of discovery to learn about the human past from this evidence. Sometimes, archaeologists do find golden treasures of lost civilizations, but more often they uncover objects of everyday life and the things that people long ago threw away. These seemingly mundane artifacts provide important information about the people who used and discarded them.

 **Explore the Online Module**

Be sure to visit the online module, where students can participate in an in-depth virtual excavation. Experience a dig—from laying out the initial grid to examining artifacts back in the lab! This virtual excavation also highlights information about the three archaeological sites featured in the exhibit and in this unit of study.

[childrensmuseum.org](http://childrensmuseum.org)

 **DIG THESE WORDS!**

- archaeologist
- excavate
- observations
- archaeology
- excavation
- profile
- artifacts
- features
- theory
- evidence
- misconception

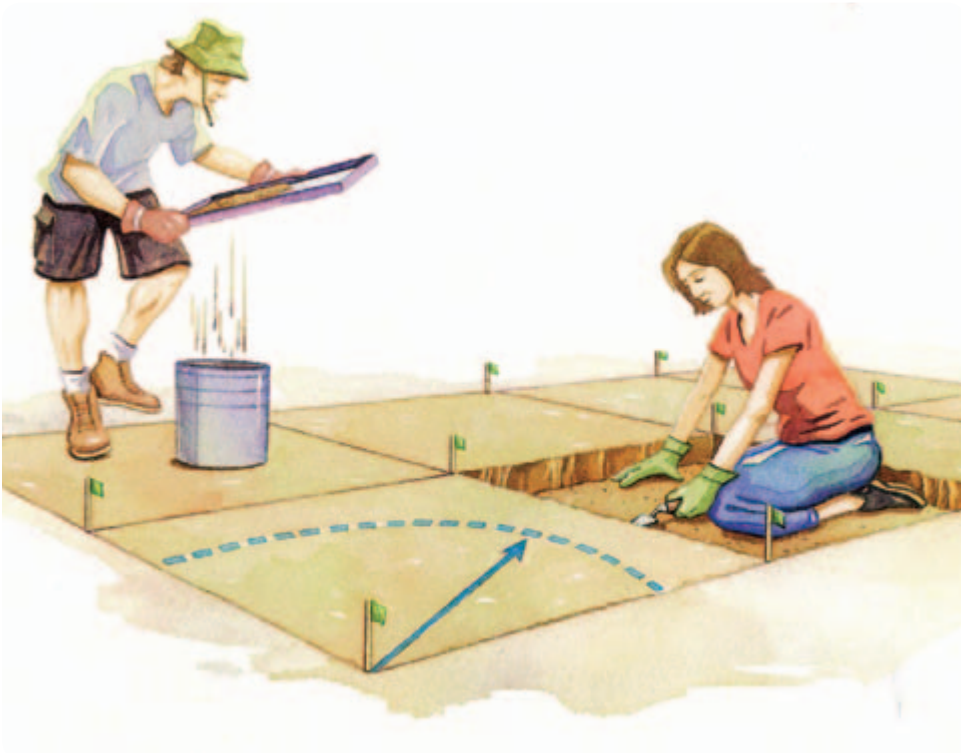
**Teacher Tip**

**Archaeology Vocabulary**

As new words are introduced in the context of unit experiences, have students create a drawing or symbol that represents each word to help reinforce concept learning. Drawings can be kept in students’ archaeology notebooks. They will be amazed at the number of words they understand by the end of the unit.



## Introductory Experience 1



*Archaeology involves careful excavation and recording of data. Notice the datum point in the lower corner of the unit. All measurements are recorded in relation to this one point.*

### What Is an Archaeologist?

Most students are likely familiar with the word archaeologist, thanks to exposure to popular fictional characters like Lara Croft, Indiana Jones, and *The Mummy* movies. Archaeologists also appear as characters in a wide variety of children's books and television shows. These characters, although entertaining, can introduce children to many misconceptions about archaeologists and what they do. In this brief introductory experience, students will share what they believe about archaeology, exposing some of these common misconceptions and providing an opportunity for correction. Then students can proceed through this unit of study with a more accurate view of archaeology.

### Procedures

#### Discover

- Write the following question on the board: What does an archaeologist do?
- Place students in small cooperative groups or share-pairs to brainstorm possible answers to this question. Answers can be single words or phrases.
- Have groups appoint a member to record their answers on a large piece of construction paper or poster board. As groups are working, circulate throughout the class and observe some of their work.
- This exercise will likely elicit some incorrect responses revealing some of the **misconceptions** students have. For example, some students might respond that archaeology is the study

of dinosaurs. Confusion about the differences between archaeology and paleontology is quite common.

- Explain to students that some of what they think they know about archaeology may be based on misconceptions, or mistaken beliefs. Many of these misconceptions come from popular culture—television, movies, and books that are intended to entertain and not educate. Everyone has misconceptions about something; that is normal. However, it is important to recognize and correct misconceptions in order to move on to a more accurate understanding of any subject.

#### Explore

- As you circulate between groups, mention any answers that reflect some of these common misconceptions and explain to the class why these answers are not completely accurate. (For your own reference, see the chart on page 81 in the Resources section for some common misconceptions and information about what archaeologists do and do not do).
- Have students cross off any incorrect responses on their lists as each misconception is discussed.

#### Teacher Tip

Have students create a chart and organize the class responses as either **facts** or **misconceptions**.

## INTRODUCTORY EXPERIENCES



Reuters

Archaeologists excavate the clay warriors using brushes to clear the dirt. The string and the measuring tape in the foreground are used to make measurements from the datum point.

### Dig Deeper

- Have each group post their papers in the room and allow students time to look at each other's work.
- Help students discuss and summarize what they have learned about what an archaeologist does.
- Ask students if they think their list gives a complete picture of what an archaeologist does. Explain that as they learn more about archaeology, they will be able to add information to the list.
- Have students record three things that they learned about archaeologists in their Treasures Classroom Notebooks.

### Investigate

- Distribute the "Think Like an Archaeologist" handout (page 11) and allow a few minutes for students to begin filling it out.
- Explain to students that they will be referring back to this sheet as they develop their understanding of archaeology over the course of the experiences in this unit of study. Have students store this paper in their Treasures Classroom Notebooks for safekeeping.
- It may be useful to create a large, poster-size version of this handout to hang in the classroom and update as appropriate.

### Extending Experiences

#### 1 An Archaeologist at Work.

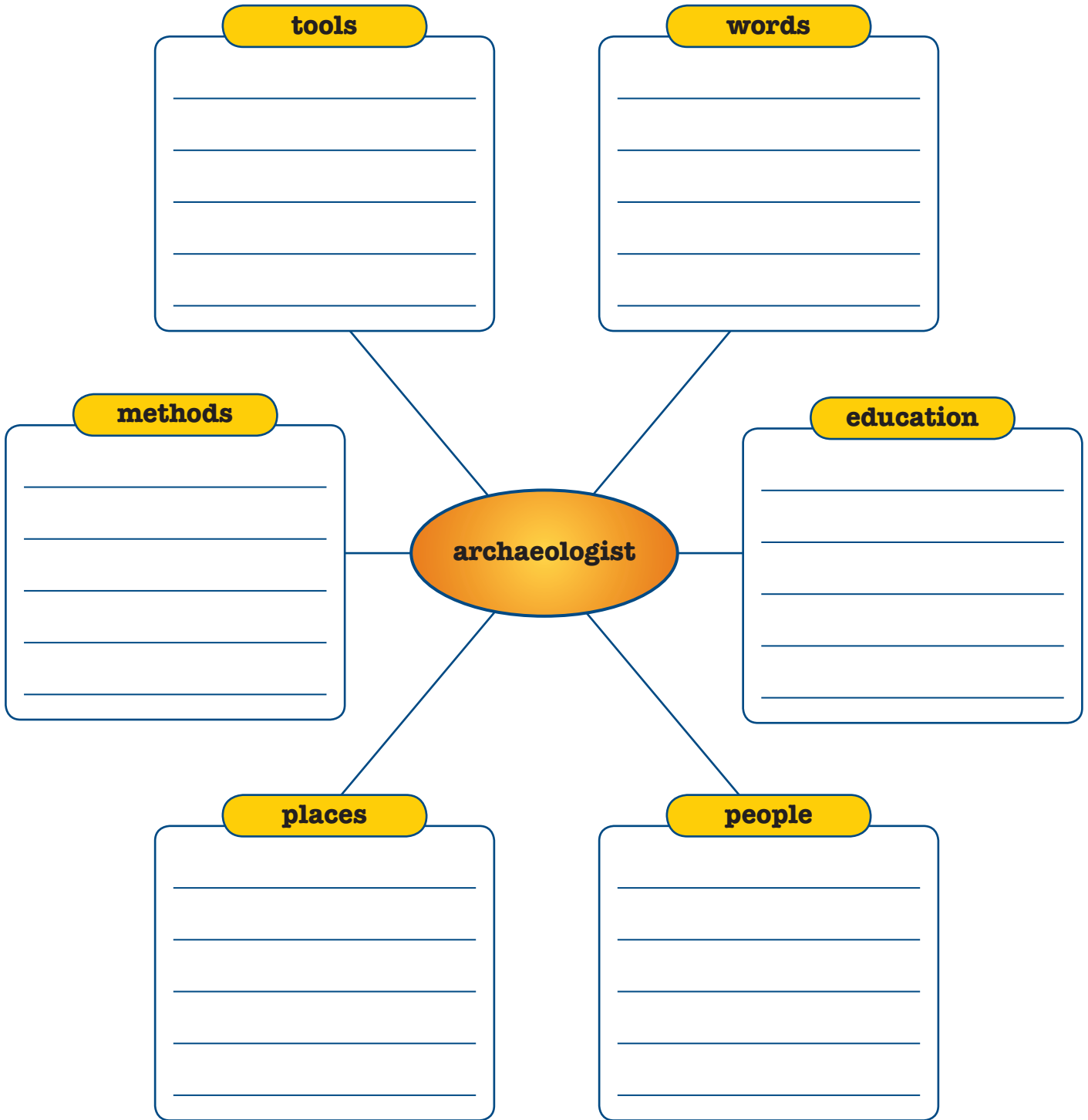
Have students reflect on the list of words and phrases that accurately represent what archaeologists are and the work that they do. Using this list as a reference point, have students draw an archaeologist at work. Any lingering misconceptions may become apparent in these drawings.

#### 2 Indiana Jones: Archaeologist, Adventurer, or Both?

Indiana Jones has helped create the popular image of an archaeologist, but his fictional exploits do not always accurately represent the work of real archaeologists. Have students compare and contrast what they know of Indiana Jones and real-life archaeologists. See the Resources section on page 82 for examples of fictional archaeologists in popular movies.

Student Handout

**Think Like an Archaeologist**



## Introductory Experience 2



The Children's Museum of Indianapolis

A unit in the process of excavation. Notice the different colored layers of dirt in the profile.

### Looking Back through Time

There is no such thing as a time machine, but archaeologists have the next best thing—an **excavation!** Through the process of careful excavation, archaeologists can literally look back in time, revealing the past layer by layer as they dig deeper into the earth. Wherever people have lived, worked, and gathered, they leave traces of themselves and their activities behind. After one group leaves, another group may come along and reoccupy the same piece of land, living and working and leaving their own traces on top of what had been there when they arrived. Over time, these layers add up, burying the evidence of the past ever deeper under the surface. Archaeologists are able to read the dirt and **artifacts** found in it to learn about the past occupation and use of a site.

The process of excavation is destructive by its very nature, so archaeologists have to take careful notes and keep detailed records. Once part of a site has been excavated, that part is destroyed and cannot be excavated again. Any information not recorded could be lost forever.

An important piece of information to record for land sites is an excavation's **profile**, the exposed column of dirt and debris left on the edge of an excavation. This profile can tell archaeologists a lot about the chronology of events at a site. Underwater archaeology sites usually do not involve profiles due to the nature of such sites. The continual movement of water disturbs the sediment deposits that would create a profile on land. Underwater sites usually also represent a single event in time, such as a shipwreck.

In this introductory experience, students will create their own archaeological profiles to help them understand the fundamental nature of an archaeological site: objects and **features** found deeper in the ground were placed there before those found higher up. Students will also practice the important archaeological skill of profile mapping.

### Grades 3–5 Academic Standards

#### National Standards

**Social Studies** — Standard II: Time, Continuity & Change

#### National Common Core State Standards

**English Language Arts** — 3.SL.1, 3.SL.3; 4.SL.1, 4.SL.3; 5.SL.1

**Mathematics** — Mathematical Practice (5)

#### Indiana Academic Standards

**Science** — Process Standards: The Nature of Science

### Grades 6–8 Academic Standards

#### National Standards

**Social Studies** — Standard II: Time, Continuity & Change

#### National Common Core State Standards

**English Language Arts** — 6.SL.1; 7.SL.1; 8.SL.1

**Mathematics** — Mathematical Practice (5)

#### Indiana Academic Standards

**Science** — Process Standards: The Nature of Science

**Social Studies** — 6.3.11

## Procedures

### Discover: What can we learn from the layers of the earth?

- Discuss the idea that layers in the earth form over time. Older things are found toward the bottom and newer things toward the top.
- Show the students the illustration on page 14. Point out that different layers of the earth are shown as different colored strips and have them locate the artifacts.
- Explain to students that an archaeologist is a type of scientist who relies on making accurate **observations** of the **evidence** he or she finds. Like all scientists, archaeologists begin by asking questions.
- Explain that one of the first questions archaeologists ask about an artifact is “Just how old is this?”
- Using the illustration on page 14, ask students what they think they can learn from the layers. For example: What is the oldest layer? What is the oldest object? What is the newest layer? What is the newest object? How do they know? Do they have any **theories** about the history of the site based on their research?

### Explore: Making a model cross-section

- Distribute at least four colors of clay and an assortment of small objects.
- Have students pick one color of clay and pat it down to represent the ground or bottom surface. Have students place several small objects on the clay to represent the things that people left behind.
- Ask students to take the second color of clay, pat it flat, and place it on top of the objects. Encourage them to think of the possible natural disasters that might have buried the site, such as a flood or volcanic eruption.

- Have students place several small objects on the new ground surface.
- Repeat the layering steps with clay and objects until all supplies have been used.
- Use a plastic knife or wire clay cutter to cut the clay creation in half and pull the two sides apart to expose the **profile**.

### Dig Deeper

- Explain that part of an archaeologist’s job is to record detailed notes about what they find. Ask: Why is this important in archaeology and in scientific work in general?
- Students will now record their unique set of layers, or profile, as an archaeologist would at a dig.
- Have students draw their layers on the handout on page 15, using the appropriate tools to measure each layer (to the nearest half inch for Grade 3 and the nearest quarter or eighth inch for Grades 4 and 5).
- Have students in Grades 6–8 draw the layers at a scale of 1 to 2. Explain that in real archaeological excavations, the profiles exposed in a 1 meter x 1 meter unit are much too large to be recorded in actual size and must be scaled down to fit the paper or computer screen being used to display it.
- Be sure students mark units of measure and scale as appropriate.
- Have students make a note of any small objects between or in the layers. Have them use their rulers to measure the location of the object (how far from the side, how far up) to make the record as accurate as possible.
- Ask students to mark the layers and objects from oldest to youngest. Note that this profile creates a kind of time line for what happened at this site and in what order.

### Investigate

- As a class, discuss what can be learned from an analysis of the profile drawing of their layers they have created.
- Ask: If this were a real archaeological excavation, which layer would be the oldest? Which artifact would be the oldest? How do you know? Students should use supporting details and examples from their diagram of the layers in their answers.
- Have students think about and respond to the following question: Why would this kind of information be important to an archaeologist at a real excavation?
- Have students reflect on and record their experiences in their notebooks.



### The Teacher Community of Inquiry:

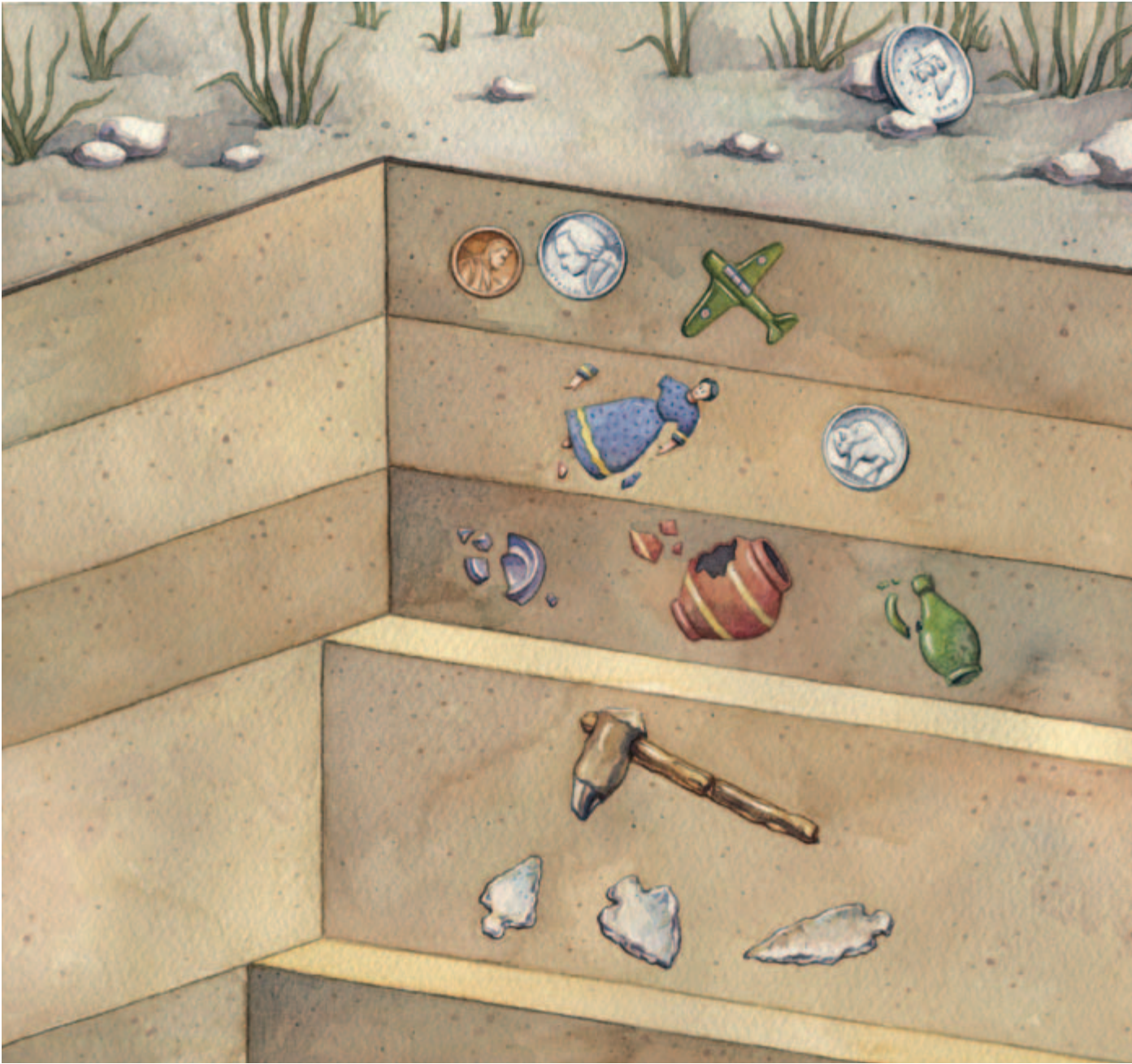
Visit the **Teacher Community of Inquiry** at [tcmteachers.org](http://tcmteachers.org) to see more images demonstrating this experience.

### Extending Experiences

Archaeologists have to make many types of measurements of space as they conduct excavations. One of the most important tasks they have is laying out units for excavation. This technique is frequently used at land and underwater sites. The units are often one meter by one meter squares. Have students use a peg board or geo board to practice creating even-sided squares.

Student Handout

**Stratigraphic Profile**



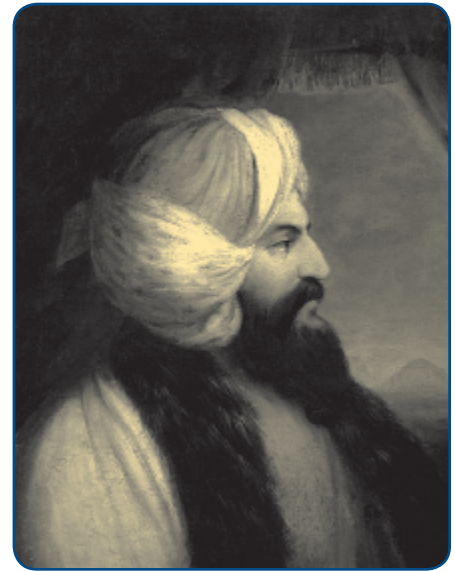
Student Handout

**Map Your Stratigraphic Profile**


## Lesson 1: Egyptian Treasures



The burial vault of Seti I's tomb is highly decorated.



### A Strong Man's Discovery

Shortly after Seti I was buried, robbers broke in and ransacked the pharaoh's tomb, stealing almost everything. They even poked around the mummy's wrappings to find valuable amulets and scraped the gold decorations off of the alabaster sarcophagus lid, shattering it in the process. The priests of ancient Egypt rewrapped the mummy and moved it to a secret location for safekeeping, leaving the empty tomb behind. More than 2,000 years later, in 1817, an Italian adventurer and former circus strongman, Giovanni Belzoni, was exploring the Valley of the Kings when he noticed an odd formation in the valley wall and decided to investigate. What he found was the tomb of Seti I. Belzoni was quite likely the first person to set eyes on the beautifully decorated tomb walls since the priests removed the mummy. Belzoni took numerous treasures from the tomb, including the empty alabaster sarcophagus, which he sold to a British museum, where it remains to this day.

Araldo De Luca Archives



### Key Challenge in the Exhibit Space:

Whose tomb is this?

Where might the mysterious tunnel lead?

This lesson addresses national and state academic standards in English Language Arts, Geography, Mathematics, Science, Social Studies, and the Visual Arts in three separate experiences. Students will learn how the work of archaeologists helped to identify the tomb of Seti I. Students will examine the location of the tomb for clues and practice measuring and data recording, both important skills for an archaeologist. These skills have had particular significance in recent work in the Valley of the Kings. Students will look for clues in the ancient Egyptian writing system, or hieroglyphics. Students will also consider potential threats to archaeological sites such as the tomb, and the responsibilities of archaeologists and the public to protect them for future generations.





The Children's Museum of Indianapolis

### Eternity in Stone

Pharaohs of the New Kingdom were not buried in pyramids, which proved too susceptible to grave robbers. Instead, many pharaohs, like Seti I, were buried in tombs built into natural cliffs in an attempt to hide them from thieves. The famous necropolis known as the Valley of the Kings contains the tombs of many of the New Kingdom's royals. A natural outcropping of rock shaped like a pyramid towers over the valley, perhaps reminding the ancient tomb builders of the sacred burial places used by their ancestors.



Foto © Sandro Vannini

*A pharaoh wears the royal Nemes crown and false beard in this painting. It is one of many similar images found in the tomb.*

### Fit for a Pharaoh?

There is no single feature that tells archaeologists beyond a doubt whose tomb this was because no mummy was found in the tomb. Rather, the identification of the tomb is made based on a series of clues that point to the identity of the owner. For example, Seti I's cartouche is one clue, but his name could be present in the tomb of an official who served the king, or in the tomb of his son, a prince, to identify his father. The use of afterworld scenes from the Amduat and the Book of Gates was usually reserved for royalty, but the image of the Opening of the Mouth ritual also in the tomb was commonly used by non-royals. The tomb is located in the Valley of the Kings, which contains many kings' burial sites but also numerous tombs of non-royal court officials. Although none of these clues on its own proves the identity of the tomb owner, the cartouche, the inscriptions, the location of the tomb, and other clues combine to make a strong argument that this was, indeed, the tomb of Seti I.



- cartouche
- hemisphere
- hieroglyphics
- hieroglyphs
- hypothesis
- inference
- latitude
- longitude
- pharaoh
- phonetic

### Teacher Tip

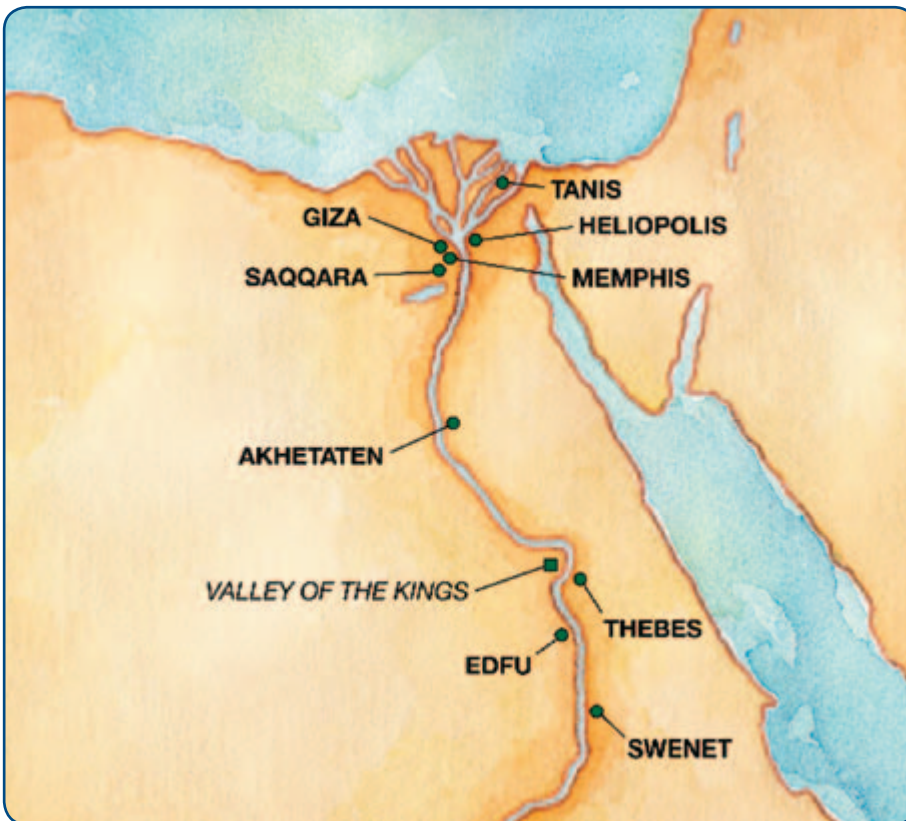
Having your students create vocabulary flash cards will be a good way for them to keep track of the new words they will learn throughout this unit of study.

## LESSON ONE

### Objectives

#### Students will

- Use mathematical skills to complete a hands-on project
- Explain why archaeology is a type of science
- Describe how archaeology contributes to what we know about the human past
- Practice skills necessary for archaeology
- Begin to think like archaeologists
- Consider the consequences of human actions on archaeological remains
- Demonstrate an understanding of the phonetic nature of Egyptian hieroglyphics
- Identify the owner of an Egyptian tomb
- Recognize characteristic artforms from ancient Egypt
- Research and participate in a debate regarding the issue of public access versus preservation of ancient Egyptian archaeological sites, artifacts, and artworks



A map of ancient Egypt with the site of the Valley of the Kings marked.

### Focus Questions

- What do archaeologists do and why do they do it?
- How do archaeologists know what they know about the past?
- Why is good record keeping important?
- Whose tomb is this, and how do archaeologists know?
- How do people affect archaeological sites?

### You Will Need

#### MATERIALS

##### Grades 3–5

- map of Egypt
- graph paper
- tape measure

##### Grades 6–8

- map of Egypt
- tape measure

### Dig Deeper with the Online Module

Visit the online module to learn more about the techniques and processes of archaeology. Discover how archaeologists have used these techniques to learn more about the tomb of Seti I.

[childrensmuseum.org/treasures](http://childrensmuseum.org/treasures)

### Teacher Tip

Be sure to encourage students to use the resources in the investigation stations, both nonfiction and fiction, to learn more about the topics in this unit of study. Guide students in the best use of nonfiction texts to make meaning, using features such as the table of contents, chapter headings, and index. Refer to the Resources section on page 78 for some examples of good children's literature to use. In this way, students will become familiar with many of the potentially unfamiliar terms they will encounter in each section, such as *pharaoh* or *hieroglyphs*.

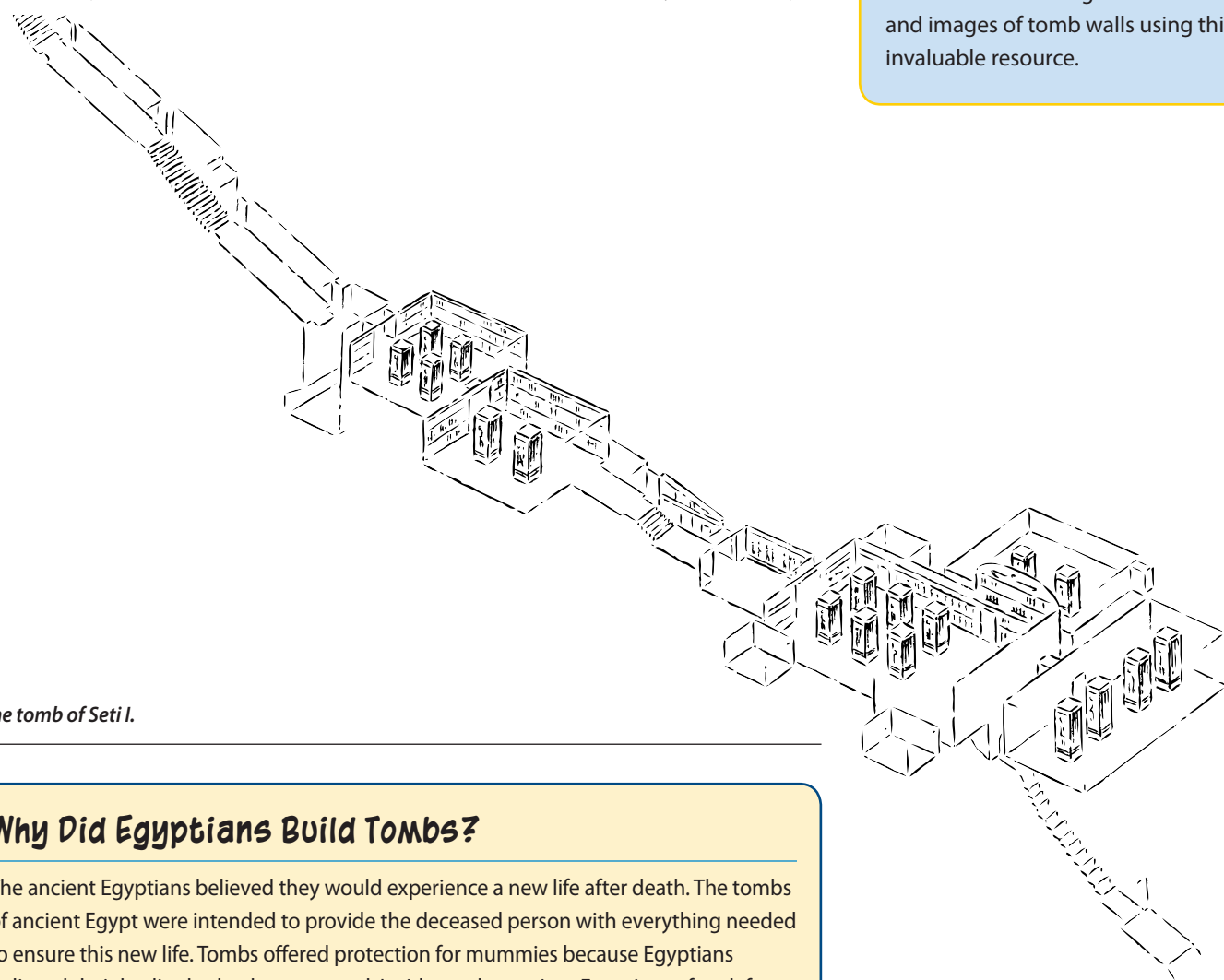
## Experience 1: Tomb Mapping

Students will examine the culture and history of the tomb site. This experience will begin by locating Egypt and the Valley of the Kings on the map using clues, including **longitude** and **latitude** and other map tools. Students will use geography skills to explore the Valley of the Kings, the site environment, and the other kinds of archaeological sites in the area. Students will use their math and mapping skills to map the interior of their classroom, just as archaeologists have mapped the inside of the tombs in the Valley of the Kings.

### Teacher Tip

#### The Theban Mapping Project

Introduce students to the Theban Mapping Project through its website at [thebanmappingproject.com](http://thebanmappingproject.com) which displays the project's important work of mapping all of the known tombs in the Valley of the Kings. Virtually explore the valley and see 3D renderings of the tombs and images of tomb walls using this invaluable resource.



*The tomb of Seti I.*

### Why Did Egyptians Build Tombs?

The ancient Egyptians believed they would experience a new life after death. The tombs of ancient Egypt were intended to provide the deceased person with everything needed to ensure this new life. Tombs offered protection for mummies because Egyptians believed their bodies had to be preserved. Inside tombs, ancient Egyptians often left funerary offerings of various kinds thought to be useful to the spirit of the dead in the next world. The Egyptians also had several texts they believed would help the spirit of the dead successfully reach the next world. These texts were often left in tombs, on papyrus scrolls, or written on walls or other objects to help the spirit on the journey to the next world. Beautiful drawings on the wall of some tombs often referred to the stories from these texts or represented the things in life that were important to the deceased person.

## LESSON ONE

### Grades 3–5

#### Academic Standards

##### National Standards

**Social Studies** — Standard II: Time, Continuity & Change; Standard III: People, Places & Environments

**Geography** — Standard 1: How to Use Maps and Other Geographic Representations, Tools, and Technologies to Acquire, Process, and Report Information from a Spatial Perspective

##### National Common Core

##### State Standards

**English Language Arts** — 3.SL.1, 3.SL.3; 4.SL.1, 4.SL.3; 5.SL.1

**Mathematics** — Mathematical Practice (5); 3.MD.8; 4.G.1, 4.G.2

##### Indiana Academic Standards

**Science** — Process Standards: The Nature of Science

**Social Studies** — 3.3.3; 5.3.1

### Grades 6–8

#### Academic Standards

##### National Standards

**Social Studies** — Standard II: Time, Continuity & Change; Standard III: People, Places & Environments

**Geography** — Standard 1: How to Use Maps and Other Geographic Representations, Tools, and Technologies to Acquire, Process, and Report Information from a Spatial Perspective

##### National Common Core

##### State Standards

**English Language Arts** — 6.SL.1; 7.SL.1; 8.SL.1

**Mathematics** — Mathematical Practice (5); 6.G.2; 7.G.6

##### Indiana Academic Standards

**Science** — Process Standards: The Nature of Science

**Social Studies** — 6.3.11; 7.1.2, 7.3.1

### Teacher Tip



### Latitude and Longitude

Your approach to having students find locations on maps and globes will depend on students' experience using latitude and longitude. If these are relatively new concepts for your students, carry out some preliminary exercises first, such as laying out a simple grid in the classroom or laying a grid over a familiar picture and using the grid to find objects. These skills can then be transferred to finding locations on maps and globes.

### Procedures

#### Discover

- Tell students that they are going to study a tomb found in Egypt, but do not tell them whose tomb it is.
- Explain that when archaeologists first find a tomb they have to look for clues to help them identify who was originally buried there.
- Explain that there is no single clue that alone identifies the tomb owner with certainty, but rather that numerous clues add up to an answer to the question: Whose tomb is this?
- Let students know that in this experience they will be looking at one of these clues.

#### Explore

- Have students begin by identifying each **hemisphere** on a map or globe.
- Then ask students to locate Egypt using longitude and latitude. The intersection of 30° N and 30° E falls within northern Egypt.
- Ask: Does the country fall in the Northern Hemisphere or the Southern Hemisphere? The Western Hemisphere or the Eastern Hemisphere?
- Next, have students locate the city of Luxor on the map. Luxor is located at 25°41' N and 32°38' E.
- Tell students that the tomb in question is located in a valley in the mountains just west of Luxor called the Valley of the Kings.

- Have students think about the name of the valley and ask: What might this tell them about the tomb?
- Explain that although there are many **pharaohs** buried in the Valley of the Kings, not all tombs contained pharaohs. More clues are needed to identify the owner of the tomb.
- Ask: What other clues can an archaeologist get from the structure of the tomb? What about the size?
- Have students suggest ways that an archaeologist can study the structure and size of a tomb. Remind them that it is underground, so it cannot be seen from the outside.
- Explain that archaeologists have to create a model of the tomb using precise measurements.

## Dig Deeper

- Students will use appropriate measuring tools (meter sticks, tapes, etc.) to practice the skills archaeologists need to use to create accurate maps of Egyptian tombs.
- Divide the class into small groups and distribute tools. Assign each group a section of the room to map.
- Encourage students in Grades 3–5 to take and record measurements around the perimeter of the room and students in Grades 6–8 to record all dimensions, wall-to-wall and floor-to-ceiling (if possible). Measurements should be taken to the nearest appropriate fraction (half inch for Grade 3; quarter or eighth inch or millimeter for Grade 4, etc.).
- Students should also measure and make note of significant features in their walls (columns, windows, air vents, white boards, etc.).
- If students are having difficulty deciding how to proceed, suggest that they consider ways to break the assignment into more manageable steps.

- Have students create a scale line drawing of their section of the classroom, indicating the location of significant features, and noting the scale of the drawing somewhere on the page (example: 1 inch = 2 feet).
- Students should use appropriate tools to draw parallel and perpendicular lines where appropriate to make the map as accurate as possible.



Foto © Sandro Vannini

## Grades 3–5

- Ask: Why is this information important to an archaeologist? What kinds of challenges would archaeologists face making these measurements inside a tomb?

## Investigate

- Show students the map of the tomb produced by the Theban Mapping Project. Note: Identify the tomb only as KV17 (its official designation) and not as the tomb of Seti I.

- Compare this tomb to the size of other known pharaoh's tombs (Ramses II, Ramses III, Ramses XI, Siptah, and Merenptah are all good examples) and to several non-royal tombs (Sit-Ra, Bay, Yuya and Thuya, Maiherperi, or any of the unknown tombs are good examples).
- Ask students if the size of the tomb is more like the royal or non-royal tombs. What might this indicate?
- Show students the tomb of Tutankhamen (small for a pharaoh's tomb) and the tomb of the sons of Ramses II (large for a non-royal tomb).
- Explain that tomb size is one clue, but can be misleading. More clues are needed to identify this tomb with certainty.
- Have students take a few minutes to reflect on this experience and record their thoughts in their Treasures Classroom Notebooks.

## LESSON ONE



Foto © Sandro Vannini

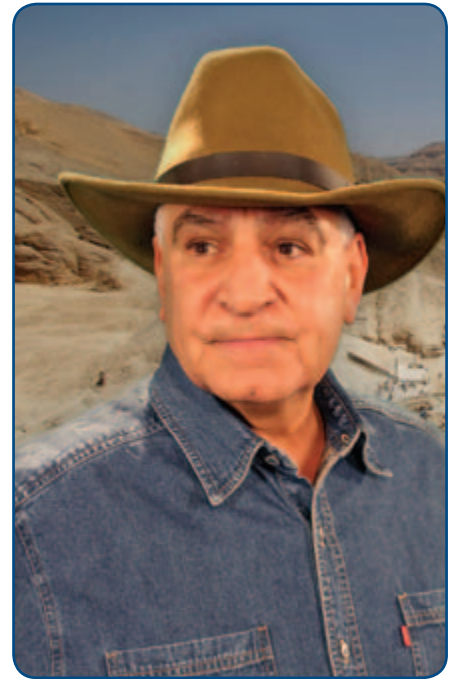
Pieces of a shabti were found in the tomb.

### Grades 6–8

- Have students use the measurements they have taken to calculate the volume of the classroom.
- If the room is a regularly shaped quadrilateral, have students simply use the appropriate formula to determine volume.
- If the room is irregularly shaped, it might be necessary to break the room into smaller, component shapes to calculate volume.
- Ask students what the calculation of the total volume of space inside a tomb tells archaeologists. In the case of a rock-cut tomb, the calculation of volume allows for an accurate calculation of exactly how much rock had to be removed to create the tomb.
- Have students discuss the amount of effort such an undertaking would have required in their small groups and report back to the class.

### Investigate

- Show students the map of the tomb produced by the Theban Mapping Project. Note: Identify the tomb only as KV17 (its official designation) and not as the tomb of Seti I.
- Compare this tomb to the size of other known pharaoh's tombs (Ramses II, Ramses III, Ramses XI, Siptah, and Merenptah are all good examples) and to several non-royal tombs (Sit-Ra, Bay, Yuya and Thuya, Maiherperi, or any of the unknown tombs are good examples).
- Ask students if the size of the tomb is more like the royal or non-royal tombs. What might this indicate?
- Show students the tomb of Tutankhamen (small for a pharaoh's tomb) and the tomb of the sons of Ramses II (large for a non-royal tomb).
- Explain that tomb size is one clue, but can be misleading. More clues are needed to identify this tomb with certainty.
- Have students take a few minutes to reflect on this experience and record their thoughts in their Treasures Classroom Notebooks.



The Children's Museum of Indianapolis

Zahi Hawass

### And the Search Continues

Archaeologists still work in Egypt today and continue to unearth great discoveries in the desert sands. In fact, world renowned Egyptologist Zahi Hawass recently explored the mysterious tunnel found in the burial chamber of Seti I, revealing its secrets for the first time in over 3,000 years. What will the sands of Egypt reveal next?

### Extending Experiences

Have students create a similar map using their bedroom or a favorite room in their house to reinforce the techniques they have developed in this experience.

## Experience 2: Write Like an Egyptian



Foto © Sandro Vannini

*Hieroglyphs from the Book of Gates show victims of the demon Apophis. This text is inscribed on the tomb wall.*

Students learn about **hieroglyphs** and how important they were to the ancient Egyptians as a way of recording information, such as their religious beliefs. Today, these texts and the stories they tell are important to archaeologists and Egyptologists for the historical clues they contain. Students will discover that the hieroglyphs and decorations inside pharaohs' tombs are not merely pretty pictures. Instead, they document the language of the ancient Egyptians and provide important information about the culture. Students will become familiar with the **cartouche** in the tomb, which provides a key piece of evidence for identifying the original owner of the tomb. Students will also apply their new understanding of how the writing system, called **hieroglyphics**, works by recording their own names in this ancient language.

### Grades 3–5

#### Academic Standards

##### National Standards

**Social Studies** — Standard I: Culture;  
Standard 2: Time, Continuity & Change

**Visual Arts** — Standard 4:

Understanding the visual arts in relation to history and cultures (a, b); Standard 6: Making connections between visual arts and other disciplines (b)

##### National Common Core State Standards

**English Language Arts** — 3.SL.1, 3.SL.3; 4.SL.1, 4.SL.3; 5.SL.1

##### Indiana Academic Standards

**Arts** — 3.1.1, 3.1.2, 3.1.3

### Grades 6–8

#### Academic Standards

##### National Standards

**Social Studies** — Standard I: Culture;  
Standard 2: Time, Continuity & Change

**Visual Arts** — Standard 4:

Understanding the visual arts in relation to history and cultures (a, b); Standard 6: Making connections between visual arts and other disciplines (b)

##### National Common Core State Standards

**English Language Arts** — 6.SL.1; 7.SL.1; 8.SL.1

##### Indiana Academic Standards

**Arts** — 7.1.1

**Social Studies** — 6.3.11; 7.1.3

## LESSON ONE

### What Is Writing?

Some archaeologists specialize in studying written languages of the past, allowing them to read the words recorded by ancient people. These written languages can take many forms, but all consist of a series of symbols that represent and document the spoken language of the people who used them. These primary documents give valuable information about the cultures that created them. Egyptian hieroglyphs are one example of symbols used to represent language. After the ancient Egyptian civilization ended, people stopped using hieroglyphs and over time forgot how to read them. It took scholars many years to decipher how the symbols worked together. Today, scholars such as Dr. David Silverman at the University of Pennsylvania are able to read hieroglyphs and learn about ancient Egyptian culture from the writing the people left behind.



Foto © Sandro Vannini



Foto © Sandro Vannini

*The sun god Re journeys through one of the hours of night on his solar barque in this chapter of the Book of Gates.*

### What's in a Hieroglyph?

Although there are some hieroglyphs that roughly correspond to the sounds in the English alphabet, hieroglyphics was not a predominantly alphabetic writing system. The alphabetic symbols are only a small fraction of the nearly 3,000 symbols that exist and the hundreds that were used regularly. Other symbols represented multiple sounds or whole words. There was yet another type of symbol used, called *determinatives* by Egyptologists. These symbols were used to help clarify the meaning of inscriptions but had no phonetic value themselves. Many symbols could be used in a variety of ways depending on the context.



The Children's Museum of Indianapolis

### Topsy-Turvey Hieroglyph

Unlike English and other strictly alphabetic writing systems, Egyptian hieroglyphics was not written in a standard orientation. Hieroglyphs could be read from right to left, left to right, or top to bottom. The orientation could even change within a single composition.



The Children's Museum of Indianapolis



## Procedures

### Discover

- Remind students that archaeologists are scientists who look for evidence in the archaeological record to answer questions about the past. Each piece of evidence can either support or refute an archaeologist's **hypothesis** about a site and lead to stronger **inferences** about the past.
- Remind them that the size of this tomb, as demonstrated in Experience 1, is one piece of evidence archaeologists have to determine the owner of this tomb, but more evidence is needed.
- Explain to students that the hieroglyphs on the tomb walls record the language of the ancient Egyptian people and that they also recorded texts that provide information about their beliefs. Archaeologists who can read the hieroglyphs can learn a great deal about ancient Egypt through these texts that were left behind.
- Explain that students are going to look more closely at the hieroglyphs in the tomb to find a new clue about its owner.
- Ask students if any of them know what a **cartouche** is.
- Tell students that a cartouche is the oval symbol around hieroglyphs that represent a pharaoh's name. Each pharaoh has two names that go inside of a cartouche: the birth name and the throne name.
- Ask: If cartouches are present in the tomb, what might they tell archaeologists about the tomb?
- Ask: Why might a pharaoh have a birth name and a throne name?

### A New Name for a New Day

Every royal child in ancient Egypt was given a name at birth, but there was no way to know in advance which royal child would grow up to become a pharaoh. Once crowned king, a pharaoh would receive a new name, his throne name, in recognition of his new position.

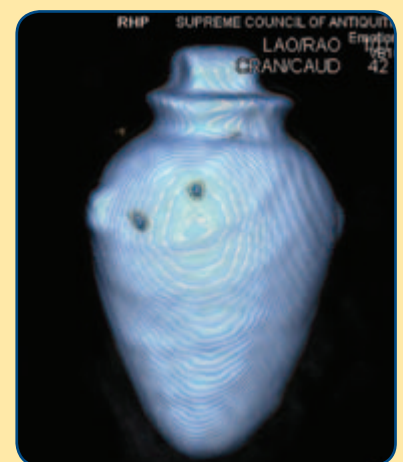
### Explore

- Explain that hieroglyphics is a writing system that records the language of the ancient Egyptians. Each symbol, or hieroglyph, inside the cartouche has a sound or sounds that it represents. These sounds together give the name of a pharaoh.
- Have students imagine that they are one of the first archaeologists to investigate this tomb. Have them look at the image of the tomb wall decoration on page 26 and identify the cartouche.
- Tell students this is a key clue about whose tomb this might be and they need to translate the cartouche to know whose name it is.
- Remind students that hieroglyphics is very different from the writing system students are used to. In ancient Egyptian hieroglyphics, there are some symbols that represent single sounds, many symbols representing multiple sounds, symbols for whole words or ideas, and symbols that represent no sound at all.



### New Technologies

New technologies offer archaeologists tools that allow investigation without the need of destruction. The benefits of this new technology are particularly evident in the use of CT scans to study mummies. Look at the CT scan of Seti I above. Do you see the objects revealed inside? In the past, the only way to find such treasures would have been to open the mummy, thus damaging it forever. "Look at the image of the heart amulet below. Can you see it in the scan of the mummy's chest above?"



## LESSON ONE

### Dig Deeper

- Distribute the handout on page 30.
- Note that the name in the cartouche is written as it sounds. Each symbol represents sounds in the pharaoh's name.
- Using the sample list of hieroglyphs and their sound values, have students translate the throne name cartouche found in the tomb and compare it to the list of possible pharaoh's names to determine whose name it is.
- Ask: Whose cartouche is this? What does this clue tell us about the tomb? Who else might have this name in their tomb?

### Investigate

- Have students apply what they have learned about cartouches and hieroglyphs to write their own name using the symbols and translations on the handout.
- Explain to students that hieroglyphs record the ancient Egyptian language. Words in other languages, like names, could be written phonetically—based on how they sound—using the symbols that represent each sound in the word. Students should use this principle to translate their own names.
- Remind students that there are no strict rules about how to translate a name into Egyptian hieroglyphs because the symbols represent the sounds of another language, but to do the best they can.
- Have students return to their “Think Like an Archaeologist” chart in their Treasures Classroom Notebooks and add any additional comments based on what they have learned or any new questions that have arisen.

### Teacher Tip

#### Writing Names Phonetically

Remember to have students focus on how their name sounds, not how it is spelled. For example, the name Phoebe would not use the literal translation of the English alphabet into hieroglyphs. Rather, students should translate the sounds of the name, or the hieroglyphic equivalent of FEEBEE.



The Children's Museum of Indianapolis

*Two cartouches record the full birth and throne names of the pharaoh Seti I.*

### More than a Name

The cartouche is only one element of the hieroglyphic texts that cover nearly every surface in Seti I's tomb. One of the important texts in this tomb is now called the Book of Gates. It is inscribed over numerous walls and tells the story of what the ancient Egyptians believed happened to the sun during the hours of night, when the sun god, Re, had to find his way past dangerous demons guarding the twelve gates of the underworld. Re must pass through these gates in order to rise again at dawn. The ancient Egyptians believed their pharaoh became one with Re in the next world and that this text could help guide him on that nightly journey.

## Experience 3: To Visit or Not to Visit



Foto © Sandro Vannini

*The discoloration in the paint in this scene from the tomb is due to damage.*

The archaeological record is very fragile and the delicate tomb paintings in the Valley of the Kings are particularly vulnerable due in large part to their popularity. In this experience, students will consider the toll human activity has taken on Seti's tomb, particularly the deterioration of the artwork due to humidity damage from the moisture in human breath, soot from early torches, and damage caused by early collectors and botched restoration efforts. Students will also consider the role site visits can play for visitors to study, record, share, and advocate for these sites in the future.

### Procedures

#### Discover

- Show students photographs featuring the wall paintings inside the tomb of Seti I. Ask them to compare the present-day condition of the paintings with artist's renderings of the original paintings. Have students speculate about what has caused the damage to the artworks.

For sources of images, visit the website [thebanmappingproject.com](http://thebanmappingproject.com), Atlas of the Valley of the Kings, Images and Media. Examples of artist's renderings include item numbers 14300 and 14310 by Giovanni Belzoni, who discovered the tomb of Seti I in 1817 and may have seen the paintings in nearly original condition, and item number 14303 by the artist Alessandro Ricci.

#### Grades 3–5

##### Academic Standards

##### National Common Core

##### State Standards

**English Language Arts** — 3.SL.1, 3.SL.3, 3.W.7, 3.W.8; 4.SL.1, 4.SL.3, 4.W.7, 4.W.8; 5.SL.1, 5.W.7, 5.W.8

##### Indiana Academic Standards

**Science** — 4.1.1

**Visual Arts** — 3.5.2, 4.5.2, 5.5.3

#### Grades 6–8

##### Academic Standards

##### National Common Core

##### State Standards

**English Language Arts** — 6.SL.1, 6.W.7, 6.W.10; 7.SL.1, 7.W.7, 7.W.10; 8.SL.1, 8.W.7, 8.W.10

##### Indiana Academic Standards

**Visual Arts** — 6.5.3, 7.5.3, 8.5.3

- Explain to students that the archaeological remains, including magnificent artworks, in the Valley of the Kings are under almost constant threat of damage from a number of possible sources.
- Have students discuss in small groups all of the dangers facing these sites and record their responses.
- If students need some direction, encourage them to consider both natural and human threats to the tomb. These could include flooding, earthquakes, fading with time, and paint flaking off as well as graffiti, dirty handprints, looting, and vandalism.
- Note that human beings are one of the biggest threats facing the tombs in the Valley of the Kings, as well as other archaeological sites around the world. The very presence of human beings is dangerous to the archaeological remains, even if they never touch a thing.

## LESSON ONE



Foto © Sandro Vannini

*Seti I is embraced by the goddess Nephthys.*

### Explore

- Ask students to think about how people affect their immediate environment.
  - Remind students that the human body is often warmer than the environment. What will human body heat do to the air temperature and humidity?
  - Ask students to hypothesize what happens to the environment inside the tomb if there are a lot of people coming in and out of it every day.
- Have students think of a light bulb. What happens to a light bulb after it has been on for a while? It gets warm. What happens to the air around the light bulb? It gets warm, too. What does this suggest might happen when people spend time in tombs?
  - Humans affect their environment in other ways. Ask students: What happens when people breathe?
  - Distribute small mirrors and instruct students to breathe onto the mirror. What happens?
  - Have students hypothesize why the mirror fogs from their breath. Explain that there is moisture in human breath that is released each time we breathe. This moisture appears as condensation on the glass of the mirror.
  - What would human breath do to the environment inside a tomb? For example, the extra heat and moisture allow fungus to grow, which can damage the paintings.
- ### Dig Deeper
- Explain to students that all of these human threats to archaeological sites—vandalism, graffiti, dirt from hands, increased temperature and moisture from people's bodies and breath—have already caused substantial damage. Even the presence of people who love and respect these sites and their beautiful artworks can be dangerous to a site's long-term survival.
  - Ask students to share some ideas about how the impact of humans, both intentional and unintentional, can be minimized.
  - Explain that the people in charge of some archaeological sites have already decided to limit access to sites in order to protect them from human damage. In some cases, such
- as the caves at Lascaux, France, an exact replica has been made so that people can visit to see what the site looks like and view reproductions of the drawings inside while still protecting the original.
- Tell students that there is currently a plan to create exact replicas of the most popular tombs in the Valley of the Kings for visitors to see and explore so that they can close the original tombs to the public. The tomb of Seti I is one of the tombs that may be recreated in this replica and people will no longer be allowed to visit the real site.
  - Have students think about some of the advantages and disadvantages of this approach. Some questions for students to consider are: Is seeing a replica as good as seeing the real thing? Is the experience of seeing a replica or a reproduction of an artwork the same as seeing the original? Are visitors always bad for real sites? Is protecting a site more important than allowing people to see it?
  - Distribute the worksheet on page 31 and have students record their ideas of both the advantages and disadvantages of using replicas.

### Teacher Tip

To explore this concept further, have your students design an experiment to measure the amount of moisture in a variety of different enclosed spaces.



Foto © Sandro Vannini

A scene from the *Book of the Heavenly Cow* is in a side chamber off of the burial vault in the tomb.

## Assessment

### Investigate and Debate

Grades 3–5 and 6–8

Explain to students that they will now use all that they have been learning about archaeology to debate a question that is important to the future of archaeology sites and the artworks many of them contain around the world.

- Divide the class into teams and explain that they are going to debate this proposition: *Visiting an archaeological replica is as good as visiting the real thing.* Assign each team a role in the debate, with half the teams arguing in the affirmative, and the other half arguing in the negative, that people should be allowed access to valuable and fragile archaeological sites.
- Allow teams time to conduct additional research to support their argument. Suggest that students investigate other sites that have made use of replicas, such as Lascaux. A wide range of information about this site is available online and can be found using a variety of search engine tools under proper

supervision. Begin by using the search term “Lascaux II.”

- Students should take notes of their research for use in building their arguments for or against the debate proposition and should also record their list of sources.
- Each team should elect a representative to deliver their opening statement.
- Arguments should be based on evidence and on the research students have conducted.
- The debate should be conducted in a respectful manner, with each person taking turns to speak, listening to others when it is their turn, and responding thoughtfully to what their classmates have said.

### Grades 6–8

- After the debate, each student should write a paper stating his or her position on whether archaeological sites and artworks should be off-limits to visitors or if people need to have access to real sites. Did the debate change their opinion or reinforce it?

## Scoring Criteria

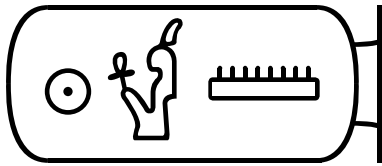
After completing the experiences in Lesson 1, each student is evaluated on the ability to apply what he or she has learned to research and debate whether replicas should be used as a means to protect actual archaeological sites, artworks, and artifacts. Students should be able to:

- Take an active role and share responsibility for researching, planning, and carrying out the debate with their group
- Use and cite a variety of resources to research the topic
- Develop a strong position statement based on research
- Give specific examples and cite evidence that supports their group’s position
- Use their knowledge of archaeology concepts, vocabulary, and the work of archaeologists to support their positions in the debate
- Identify a specific point of view regarding both access to and preservation of artworks
- Use listening and speaking skills to communicate ideas effectively
- Use good teamwork skills and show respect for other students, including those who present an opposing position in the debate
- Students in Grades 6–8 write a paper based on research and evidence stating a personal position on whether archaeological sites should be off-limits to visitors. The paper should include an introduction, examples and evidence that support the writer’s position, and a conclusion. Research sources should be appropriately cited.

**Cartouche Translation Handout**

**WHOSE CARTOUCHE IS THIS?**

This cartouche appears repeatedly in the tomb. It represents one of the names of a pharaoh. Use the hieroglyphs below to translate the name and identify the pharaoh from the list. (Remember, hieroglyphs do not always read left to right like English.)



**POTENTIAL PHARAOHS**

BIRTH NAME	THRONE NAME
Ramesses (Ramses I)	Menpehtyra
Setimerenptah (Seti I)	Menmaatra
Ramesisu Meriamon (Ramses II)	Usermaatre Setepenre
Merenptah	Baenra
Setimerenptah (Seti II)	Userkheperura Setepenra
Siptah	Akehrasetepenra



Student Handout

**Replicas: As good as the real thing?**

What are the advantages to using replicas of real archaeological sites for tourists?	What are the disadvantages to using replicas of real archaeological sites for tourists?

## LESSON ONE

### Scoring Rubric

#### Remedial

The student does not take a fair share of responsibility in preparing for the debate. The student does not engage in research or does so in a minimal way and does not provide samples or evidence that can be used by the group. The student does not demonstrate understanding of learning concepts from the unit, such as the use of appropriate vocabulary, or the idea that context helps to determine the age of an artifact. The student presents a portion of the groups' argument in the debate but may fail to speak clearly, face the audience, and listen to others when they speak. A student in Grades 6–8 produces a minimal paper that may state an opinion but does not provide any supporting evidence.

#### Partial

The student takes some responsibility in preparing for and carrying out the debate and makes minimal contributions that can be used by the group to support their argument. The student understands and uses some of the concepts introduced in the unit but is not proficient. The student shows respect for other students but may have difficulty stating an opposing position effectively. The student listens to others but may need coaching in using speaking and presentation skills. A student in Grades 6–8 produces a paper but may fail to organize ideas effectively. The position statement is supported with minimal evidence or examples.

#### Essential

The student takes responsibility for researching the topic and helps his or her team prepare for the debate by contributing evidence or new examples that support the group's position. The student uses archaeological concepts and vocabulary appropriately and is able to state the group's position effectively,

including the group's point of view on public access to artworks. The student shows respect for and listens to others. The student speaks clearly and is able to gain audience attention with minimal coaching. A student in Grades 6–8 produces a paper with an introduction, body, and conclusion. The student states his or her position clearly, supports that position with several examples or evidence, and cites sources of research.

#### Exceptional

The student takes active responsibility for helping his or her team research, plan, and prepare for the debate without overpowering the contributions of others. The student examines a variety of sources and contributes numerous examples and new ideas that the group can use to support their position. The student helps anticipate opposing arguments and develop effective strategies for defending the team's position. In the debate setting, the student speaks clearly, uses body movements and gestures to help communicate ideas, and keeps the audience engaged. The student uses archaeology terms and concepts fluently and effectively. The student can state a well-reasoned point of view regarding the aesthetic experience of viewing original artworks versus the need to protect and preserve sites, artifacts, and works of art. The student listens to other speakers carefully, including the opposing team, and is able to use examples and evidence to rebut opposing arguments respectfully. A student in Grades 6–8 presents a strong position statement and elaboration that demonstrates understanding of the issues faced by archaeologists. The student organizes ideas effectively, supports his or her argument with several examples, and cites credible evidence from a wide variety of sources.

### Extending Experiences

Have students research recent events in Egypt and the impact they have had on the antiquities and archaeological sites in the country. Students should consider the role Zahi Hawass, Egypt's most famous archaeologist, has played and will continue to play in these events.

### Seeing the Real Thing

Many museums have Egyptian collections that students and their families can visit for themselves, including The Children's Museum and the Indianapolis Museum of Art. There are two Egyptian mummies on permanent display in Indiana, both in the city of Richmond—one at the Joseph Moore Museum at Earlham College and the other at the Wayne County Historical Museum. Other Midwest museums with Egyptian collections include the Oriental Institute and the Field Museum, both in Chicago; the Art Institute of Chicago; and the Cincinnati Art Museum. The Brooklyn Museum and the Metropolitan Museum of Art in New York City are both well-known for their extraordinary collections of Egyptian art.

### Online Connection

Be sure to visit the **Teacher Community of Inquiry**, [tcmtteachers.org](http://tcmtteachers.org), for more resources on ancient Egypt, to view student work, or to submit your own students' work for others to see what you have accomplished in your own classroom. Share your thoughts on these experiences or share how you may have adapted them for your students.



## Lesson 2: Chinese Treasures



An artist's rendering shows what the site may have looked like during work on the tomb of the First Emperor.

Hsien-Min Yang/National Geographic Stock



© The British Library Board

### Meet the Emperor

The First Emperor of China, named Zhao Zheng (*jow jeng*) at birth, was the son of a captive prince of Qin (*chin*) being held hostage in the kingdom of Zhou during the last few years of the Warring States period. Little Zhao Zheng became king of Qin at age 13 and soon set out to conquer the known world. One by one, King Zheng brought the warring kingdoms under his control until he ruled over all of them. Zhao Zheng changed his name to Qin Shihuangdi (*chin shee-whong-dee*), meaning First Sovereign Qin Emperor. During his reign, Qin Shihuangdi introduced many valuable changes in his empire, including standardizing weights and measures, currency, the width of cart axles and the written language. The First Emperor also instituted a governing system known as Legalism that dictated harsh punishments for those who did not follow his laws. Historic records indicate that he burned many books and oppressed those who did not agree with him.

### Key Challenge in the Exhibit Space:

Who made these figures and why?

This lesson will address national and state academic standards in English Language Arts, Geography, Mathematics, Science, Social Studies, and Visual Arts in three separate experiences. Students will learn about who created the Terra Cotta Warriors of China, a key challenge in the exhibit, and how the practice of archaeology has helped to reveal their secrets. Students will learn about the discovery of the site and how excavations and analysis of the evidence left behind helps to create a better understanding of the site through the interpretation of that evidence. Students will also consider the possible explanations for why the site was built and what it says about the culture that created it.

## LESSON TWO

### Objectives

#### Students will

- Use map reading skills to locate a possibly unfamiliar location on a globe
- Use math skills to determine the number of possible combinations of a set number of parts
- Continue to develop objectives from Lesson 1
  - Explain why archaeology is a type of science
  - Describe how archaeology contributes to what we know about the human past
  - Practice skills necessary for archaeology
  - Begin to think like archaeologists
- Describe some techniques used to create the Terra Cotta Army
- Make inferences about the First Emperor of China
- Recognize unique characteristics of the art of the Terra Cotta Warriors
- Create their own sculpture representing something of personal and community significance, and write a self-assessment reflecting on the effectiveness of their work in communicating the intended idea

### Focus Questions

- Why are maps important to archaeological research?
- Who built the Terra Cotta Army?
- Why was it built?
- What can we learn about ancient China from the Terra Cotta Army?

  
**DIG  
THESE  
WORDS!**

- attribute
- datum point
- emperor
- inference
- interpret
- probability
- sculpture
- terra cotta

### You Will Need

#### MATERIALS

##### Grades 3–5

- materials for sculpture such as clay, paper, cardboard, wood, foil, foam, or found objects
- handouts on pages 49–54
- scissors
- colored pencils, markers, or crayons
- glue

### You Will Need

#### MATERIALS

##### Grades 6–8

- materials for sculpture such as clay, paper, cardboard, wood, foil, foam, or found objects
- handouts on pages 49–54
- scissors
- glue

### Dig Deeper with the Online Module

Visit the *National Geographic Treasures of the Earth* online module on the museum's Web site at [childrensmuseum.org](http://childrensmuseum.org) to learn more about the techniques and processes of archaeology. Discover how archaeologists have used these tools to uncover the secrets of the Terra Cotta Warriors of China's First Emperor.

## Experience 1: Where in the World Is the Terra Cotta Army?



Courtesy Bill Tyne

*The burial mound of the First Emperor as it appears today.*

Maps are of great importance to archaeological research. Not only do maps help archaeologists find sites of interest, but they can also help reveal clues to the distant past. An accurate map can help illuminate the relationship between separate archaeological sites in ways that might not be readily apparent from ground level. Patterns can emerge in regional settlement and land use, and ancient city plans can be rediscovered. An analysis of the map archaeological zone near Xi'an (*shee-an*) in Shanxi (*shahn-shee*) Province, China, where the Terra Cotta Army was discovered in 1974, reveals some interesting clues about the relationship of this site and other prominent archaeological sites in the region. In this experience, students will find Xi'an on a map or globe and look more closely at the relationship of the warrior site to other archaeological sites nearby. Students will also practice their own map-making skills by creating an accurate map of their classroom, skills that are vital for a successful archaeologist.

### Grades 3–5 Academic Standards

#### National Standards

**Social Studies** — Standard II: Time, Continuity & Change; Standard III: People, Places & Environments

**Geography** — Standard 1: How to Use Maps and Other Geographic Representations, Tools, and Technologies to Acquire, Process, and Report Information from a Spatial Perspective

#### National Common Core

##### State Standards

**English Language Arts** — 3.SL.1, 3.SL.3; 4.SL.1, 4.SL.3; 5.SL.1

**Mathematics** — Mathematical Practice (5); 4.MD.5, 4.MD.6, 4.G.1; 5.NF.5

#### Indiana Academic Standards

**Science** — Process Standards: The Nature of Science

**Social Studies** — 3.3.3; 5.3.1

### Grades 6–8 Academic Standards

#### National Standards

**Social Studies** — Standard II: Time, Continuity & Change; Standard III: People, Places & Environments

**Geography** — Standard 1: How to Use Maps and Other Geographic Representations, Tools, and Technologies to Acquire, Process, and Report Information from a Spatial Perspective

**Visual Arts** — Standard 4:

Understanding the visual arts in relation to history and cultures (a, b); Standard 6: Making connections between visual arts and other disciplines (b)

#### National Common Core

##### State Standards

**English Language Arts** — 6.SL.1; 7.SL.1; 8.SL.1

**Mathematics** — Mathematical Practice (5)

#### Indiana Academic Standards

**Science** — Process Standards: The Nature of Science

**Social Studies** — 6.3.11; 7.3.1

## LESSON TWO

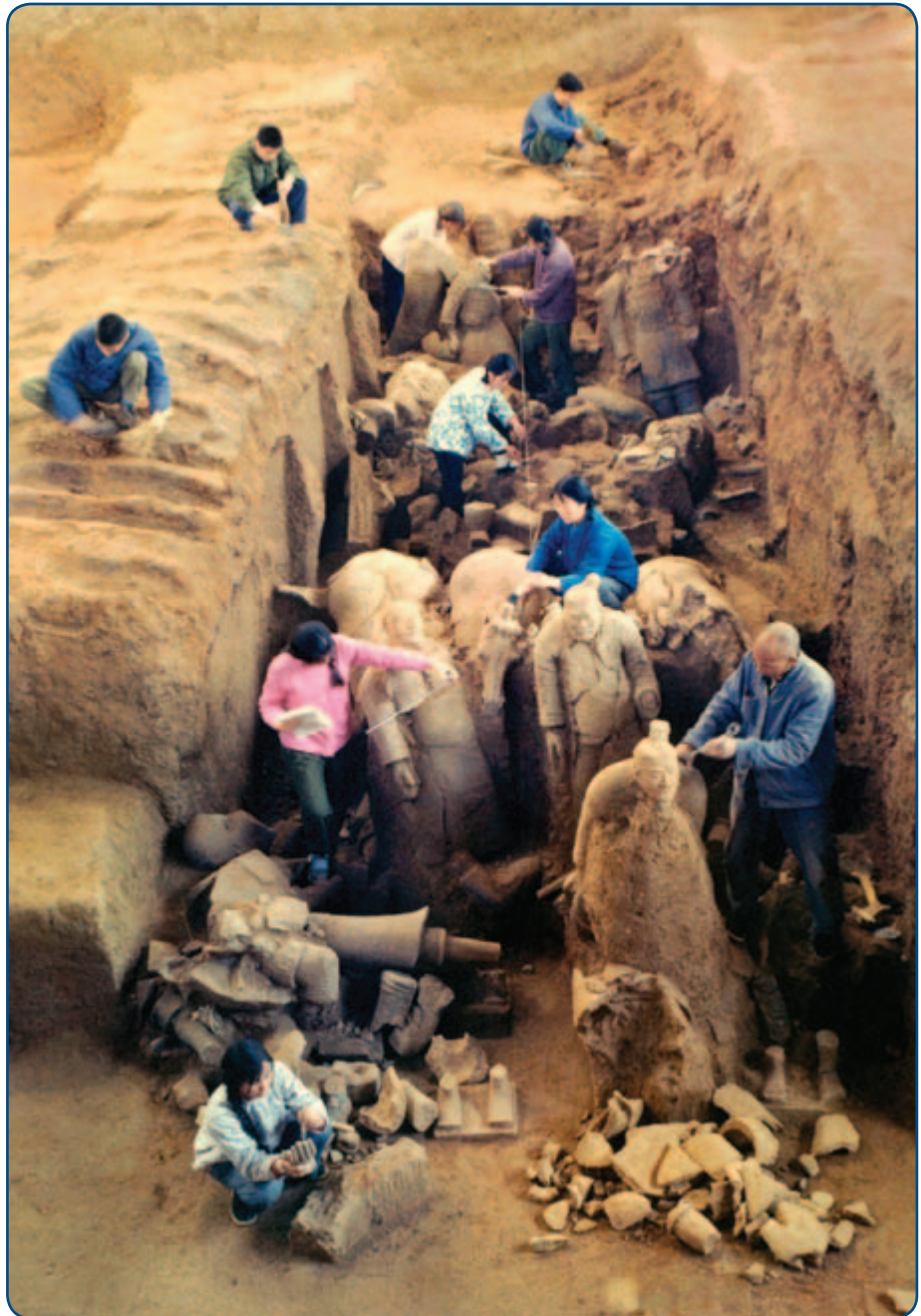
### Procedures

#### Discover

- Explain to students that they are going to locate the site of the **Terra Cotta Warriors** on a globe or map.
- Distribute globes or maps to the students and ask them to begin by locating the Eastern Hemisphere.
- Have students locate China, explaining that it is a large country in the eastern part of the Eastern Hemisphere.
- Explain that China is an ancient country with a history going back about 4,000 years. The first ruler to successfully unite the many regions of ancient China was the First **Emperor**, who lived over 2,000 years ago.
- Note that China is a very large country and more information is needed to find the site of the Terra Cotta Warriors.

#### Explore

- Explain that China today is organized into 22 provinces, which are a little like states in the United States. The site of the Terra Cotta Warriors is found in Shanxi Province.
- Have students locate Shanxi Province using the clues provided by the province's longitude and latitude, between 31° and 39° N and 105° and 111° E.
- Tell students that the Terra Cotta warriors are located near the city of Xi'an, the capital of Shanxi Province.
- Have students locate Xi'an on the map, inside Shanxi Province, near 34° N and 108° E.
- Have students find Indianapolis on the map and identify its location by latitude and longitude. Compare the location of Xi'an to Indianapolis. Which city is farther north? Hint: Compare the latitude of each city.
- Using the map scale, have students determine how far Xi'an is from Indianapolis. Be sure they compare distances measuring both from the East and West. Which route is shorter?



The Image Works, Inc.

*Archaeologists excavate the Terra Cotta Warriors in China.*

- Now that students have located Xi'an on a map or globe, distribute the Xi'an region archaeological map on page 49.
- Have students identify the location of key features: the pits where the Terra Cotta Warriors were excavated and the burial mound of the First Emperor.
- What can the location of these archaeological features tell us about their relationship? What if archaeologists did not have good maps showing these locations? How might it change what archaeologists think about the sites?

### Dig Deeper

- Explain that archaeologists rely on maps of big areas to show the relationship between sites, but they also rely on maps of small areas to learn about individual sites. These archaeological maps are called *surveys*.
- Students will now practice creating their own map or survey of a site—the classroom.
- First, the classroom site must be divided up into equal units of a grid system. This grid system will help identify locations in the room, much like longitude and latitude help to locate sites on a map or globe.
- Label the grid with numbers on one axis and letters on the other to identify each unit of the grid. For example: 1A, 2A, 1B, etc.
- Divide the students into teams so that each is assigned one “box” or unit on the grid. Teams should note the identity of the unit, such as 1A.
- Each team should draw a box to scale on their piece of paper to represent their unit of the grid. (For example: 1 inch = 1 foot). This will be the team’s survey map.
- Students should pick one corner of their unit of the grid to be the **datum point**, a fixed reference point that will be used to record the position of objects found inside the box. Mark this corner on the survey map.
- Have students look for features or objects inside their grid unit (this could include desks, tables, plants, pencils, paper clips, toys, or books).
- Have students record the position of these objects and features on their survey map.
  - Use the datum point to record the position of each item.
  - Use the measuring tape to measure the distance of the object from the datum point and the



The Children's Museum of Indianapolis

### From the Earth

Archaeologists rely on many different science experts to conduct specialized research on the artifacts they find, which can reveal a lot about artifacts that cannot be seen with the naked eye. In the case of the Terra Cotta Warriors, experts in palenology—the study of plant spores and pollen—have helped shed light on where the figures were made. Pollen from the air got stuck on the still-wet clay when the figures were made and became trapped when the figures were fired. Different concentrations of pollen embedded in the clay of the horse figures indicate that they were created very near the tomb of the First Emperor, but the pollen in the warriors suggests that they were made far away and brought to the site.

protractor to measure the angle of the line from the datum point to the object.

- Using the scale and angle, draw the object in the appropriate location on the survey map.

### Investigate

- Once each team has finished recording all of the objects and features found in their box of the grid, have teams switch maps, so that each team is looking at the map from another team.
- Each group will analyze the new map and report on their findings, answering the question: Analyzing

the evidence in the survey, what can they tell about the survey area based on what is on the map? What kinds of activities might go on in that area?

- Ask: Why is it important for an archaeologist to make such a detailed survey? How could it change the interpretation of a site if a survey was inaccurate?
- Have students take a few minutes to reflect on these questions, discuss their answers, and record their thoughts in their Treasures Classroom Notebooks.

## LESSON TWO

### Experience 2: Building an Army

In this experience, students will explore the potential of interchangeable standard parts to create a large number of unique creations in different combinations. Students will use math skills to determine the number of possible combinations and visually illustrate the point by completing representations of different possibilities.



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#### Fragile Army

The roof of the pits containing the Terra Cotta Army collapsed over 2,000 years ago, crushing the clay figures under the weight of ceiling beams and earth. Today, archaeologists must dig very carefully as they uncover the fragments that remain to be sure they cause no additional damage.

As archaeologists carefully excavated the Terra Cotta Warriors, they were struck by how unique each soldier was, almost as if each statue depicted a different real-life soldier in the First Emperor's army. Research has revealed that, although no two soldiers look exactly alike, they were created using a series of interchangeable standard parts. Heads, hands, and legs could be mass produced in molds and attached to the torso at different angles. Sculptors further individualized each soldier by adding details when the clay was still wet and painting them in vibrant colors. Using this combination of mass production and detail finishing, ancient Chinese artisans were able to produce an army of thousands of seemingly unique warriors.

#### Grades 3–5 Academic Standards National Standards

**Social Studies** — Standard II: Time, Continuity & Change

**Visual Arts** — Standard 4:

Understanding the visual arts in relation to history and cultures (a, b); Standard 6: Making connections between visual arts and other disciplines (b)

#### National Common Core State Standards

**English Language Arts** — 3.SL.1, 3.SL.3; 4.SL.1, 4.SL.3; 5.SL.1

**Mathematics** — Mathematical Practice (4); 3.OA.1, 3.OA.5; 5.NF.6

#### Indiana Academic Standards

**Visual Arts** — 3.1.2, 3.1.3, 3.8.2; 4.2.1, 4.8.1

#### Grades 6–8 Academic Standards National Standards

**Social Studies** — Standard II: Time, Continuity & Change

**Visual Arts** – Standard 4:

Understanding the visual arts in relation to history and cultures (a, b); Standard 6: Making connections between visual arts and other disciplines (b)

#### National Common Core State Standards

**English Language Arts** — 6.SL.1; 7.SL.1; 8.SL.1

**Mathematics** — Mathematical Practice (4); 7.SP.8

#### Indiana Academic Standards

**Visual Arts** — 6.1.2; 7.1.1, 7.2.1, 7.2.2, 7.3.2; 8.1.1

**Social Studies** — 6.3.11

## Procedures

### Discover

- Show students the images of the Terra Cotta Warriors on page 48 , or additional images. Many images can be found online using a search engine to find “Terra Cotta Warriors.”
- Ask students to look closely at the **attributes** of each soldier and describe the sculptures. What do they see? How are they the same as each other? How are they different?
- Explain to students how the Terra Cotta Warriors were created using molds and standard parts combined with detailed sculpting to result in thousands of unique creations.
- Ask students to consider and discuss the possible advantages and disadvantages to this method of producing the clay soldiers.
- Can students think of any examples of similar types of production today?

- Ask students to brainstorm what method should be used to calculate the answer. Have students explain their thinking and defend their ideas.



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### Grades 3–5

#### Explore

- The production technique used by the ancient Chinese artisans to make the Terra Cotta Warriors is capable of producing a staggering number of unique sculptures. Explain to students that they will now explore how this works on a smaller scale.
- Explain to students that they will be creating their own unique figures using a limited number of standard pieces, but first they have to calculate the possible number of unique combinations of standard parts.
- Students will have a choice of three head shapes, three torsos, two pairs of legs, two pairs of arms, and two pairs of hands.
- Show students the images of these standard parts on pages 50–53.
- Have students guess how many combinations they will be able to make with these pieces.

### Creating an Army: Who's Who?

The master sculptors who designed the Terra Cotta Warriors used a variety of techniques, including molds, sculpting, mixing paints, and selecting colors to create different types of soldiers. The warriors have different uniforms, hairstyles, weapons, tools, and other implements. These distinguishing features help archaeologists identify the ranks and roles of the individuals represented.

#### Dig Deeper

- If no one gives the correct answer, explain that determining the number of combinations is a simple case of multiplication.

- Have students multiply the first two sets of body parts together: three heads and three torsos, or  $3 \times 3$ .
- Explain that this number is the number of different ways the heads and torsos can be combined.
- Next, have students add the third set of body parts. To determine the number of unique ways the pairs of legs can be combined with the heads and torsos, multiply the answer to  $3 \times 3$  by the number of pairs of legs, 2.
- Have students continue this multiplication process with the pairs of arms and pairs of hands.
- In the end, students will have found the answer to the number of possible unique combinations of these standard pieces,  $3 \times 3 \times 2 \times 2$ . Ask: How many possible unique combinations can be made using only these 12 standard parts?



Reuters

### Interchangeable Parts

Archaeologists know that each warrior was made using a limited number of molds to create certain pieces, like heads and hands. What is still unclear, however, is how many standard molds of each body part were used. For example, were there eight standard head molds or ten? Scholars continue to debate and the actual number may never be known for sure.

## LESSON TWO



C. Blänsdorf, Technische Universität München, "China-Project"

### How Did They Do That?

One of the questions archaeologists often ask is how things were done in the past. Unfortunately, ancient people seldom left instruction manuals behind and the only way for archaeologists to learn about the past is by getting their hands dirty. Experimental archaeology is a field in which archaeologists study an object, such as a Terra Cotta Warrior, and try different ways to replicate it until they find the way that produces the most accurate facsimile. These experiments reveal a lot about the processes used by ancient people. In this way, archaeologists now know how the warriors were made. Modern sculptors create replicas of the warriors today using similar techniques.

### Teacher Tip

Prepare for this activity ahead of time by pre-assigning possible combinations and creating the necessary number of each piece before you begin. You can sort the pieces into marked bins and have students pick out the pieces they need after receiving their assigned combination.

### Investigate

- Assign each student one of the unique combinations of parts (see pages 50–51) and distribute the assigned copies of body parts to each student to complete a warrior.
- Have students cut out the body parts and assemble them on a separate piece of paper.
- Explain to students that the Terra Cotta Warriors were once colorfully painted, which contributed to the effect of making each warrior unique.
- Have students color their figures using the same color palette the ancient Chinese artists used (see **Ancient Colors** on page 41) and draw in additional details on the figure the way the ancient Chinese sculptors carved in details like mustaches and eyebrows.
- Once all of the figures are completed, hang the students' work around the classroom and ask students if they see any figures that are the same.
- Have students imagine how many more unique combinations there would be if there were more standard molds used. For example, imagine there were 8 head molds, 10 torsos, 6 pairs of arms, 5 pairs of hands, and 5 pairs of legs and feet. These numbers could produce 12,000 unique combinations out of only 34 standard parts!
- Ask students to discuss their creations and what they have learned about how the Terra Cotta Warriors were created and how that production technique helped to create thousands of unique warrior figures.
- Students should think about all of the resources that went into creating the Terra Cotta Army, including both the materials and the time involved. What does this tell archaeologists about the person who had them built?
- Allow time after discussion for students to record their thoughts in their Treasures Classroom Notebooks.



### Ancient Colors

Scientists studying the remnants of paint left on the Terra Cotta Warriors have determined that the type of tempura paint used was created using egg and an as-yet-unknown second ingredient as the binding agents. The pigments used were derived from a variety of organic and inorganic substances, creating a palette of vibrant colors. The following chart, based on the research by Technische Universitaet Muenchen, indicates the colors used and the pigments that were used to create them.

COLOR	PIGMENT
RED	Cinnabar
PINK	Bone white + cinnabar
GREEN	Malachite
BLUE	Light blue azurite
PURPLE	Barium copper silicate ( <i>man-made</i> )
WHITE	Bone white, kaolin
BROWN	Brown earths
BLACK	Bone black
YELLOW	Golden ochre, vanadinite

Note: Bone white is produced from burning bone at high temperatures. Bone black is produced by charring bone.

### Extending Experiences

- **Growing a Tree.** Have students complete a tree diagram to construct a list of all of the possible combinations of themselves.
- **Who's Who?** Have students look at the images of Terra Cotta Warriors on pages 50-51 and theorize what their roles in the army might have been. Students should use their observations of the figure (costume, stance, etc.) to support their conclusions.

### Grades 6–8

#### Explore

- The production technique used by the ancient Chinese artisans to make the Terra Cotta Warriors is capable of producing an astonishing number of unique sculptures. Explain to students that they will now explore how this works on a smaller scale.

- Explain to students that they will be creating their own unique figures using a limited number of standard pieces, but first they have to calculate the possible number of unique combinations of standard parts.
- Students will have a choice of four head shapes, three torsos, three pairs of legs, three pairs of arms, and two pairs of hands.
- Show students the images of these standard parts on pages 52-53.
- Have students guess how many combinations they will be able to make with these pieces.
- Explain that determining the number of combinations is a simple case of multiplication. Therefore, the possible number of combinations is equal to  $4 \times 3 \times 3 \times 2 \times 3$ , or 216 possible combinations of the 15 standard parts.

### Dig Deeper

- Ask students to think about the method they just used to determine the number of possible combinations that can come from these 15 standard parts.
- Have them imagine that they are part of a team creating these sculptures and they want to be sure that they do not create a duplicate of any other warrior. How can they be sure that the combination they are working on has not already been used?
- Point out to students that knowing there are 216 possible combinations does not tell them what those 216 distinctly different combinations are, but there are ways to figure them out.
- To further illustrate the point of how many different combinations are possible, as well as to identify each distinct combination, have students construct tree diagrams showing these unique combinations. Students may need multiple pieces of paper or large posters to complete their diagrams.
- Ask: What is the **probability** of any one combination of parts being picked? Hint: The probability of this happening is one out of the total possible number of combinations.
- Ask: What is the probability that two different artisans would pick the exact same combination of parts? Hint: If the probability of one artist picking a combination is one out of the total number and the probability of the second artist independently picking the same combination is also one out of the total number, then to determine the probability of both picking the same combination, multiply the two independent probabilities together to get the answer. In other words, if probability 1 is one in four ( $1/4$ ) and probability 2 is one in four ( $1/4$ ), the odds of both making the same choice would be one in sixteen ( $1/16$ ).

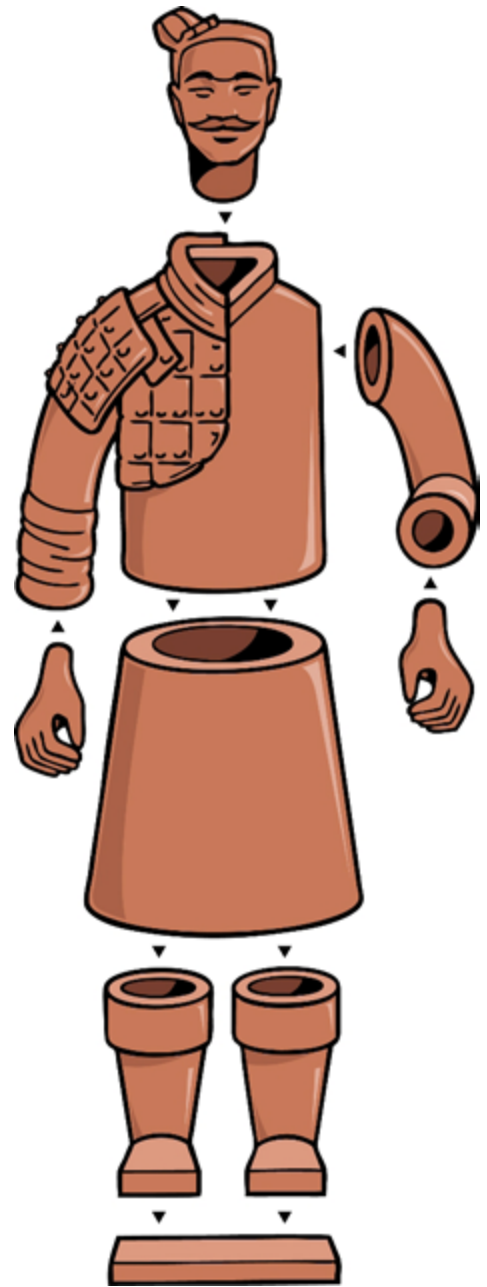
## LESSON TWO

### Investigate

- Have students pick one of the combinations from the results of their diagram and cut out the appropriate body parts and assemble them on a separate piece of paper.
- Once all of the figures are completed, hang the students' work around the classroom and ask students if they see any warriors that are the same.
- Have students imagine how many more unique combinations there would be if there were more standard molds used. For example, imagine there were 8 head molds, 10 torsos, 6 pairs of legs, 5 pairs of hands, and 5 pairs of legs and feet. These numbers could produce 12,000 unique combinations out of only 34 standard parts!
- Ask students to discuss their warriors and what they have learned about how the Terra Cotta Warriors were created. How do they think that production technique helped to create thousands of unique warrior figures?
- Students should think about all of the resources that went into creating the Terra Cotta Army, including both the materials and the time involved. What does this tell archaeologists about the person who had them built?
- Have students discuss their answers and record their thoughts in their Treasures Classroom Notebooks.

### Extending Experiences

1. **Mass Production in the Modern World.** Ask students to choose a present-day product they are familiar with, such as a cell phone. Have them research the way the product is manufactured and customized and explore the question: How are parts in different combinations used in the manufacturing process?
2. **Build a Warrior.** Have students create a replica of one of the Terra Cotta Warriors. Explain that a replica is an attempt to create an exact copy of the original, including color and pattern detail. Have each student pick a different image of a warrior to replicate to create your own class replica of the Terra Cotta Army. Additional examples of Terra Cotta Warriors can be found online using a Web search engine.
3. **Who's Who?** Have students look at the images of Terra Cotta Warriors on pages 52–53 and theorize what their roles in the army might have been. Students should use their observations of the figure (costume, stance, etc.) to support their conclusions.



## Experience 3: The Important Things in Life

Just like the Egyptian pharaohs tried to take everything with them to the next life, the First Emperor of China tried to take his world with him. In this experience, students will contemplate on a smaller scale this ancient attempt to recreate the world. They will explore how artifacts tell archaeologists about what was important to the First Emperor. Students will also consider what elements of their own world are important enough to include in a re-creation for eternity.



The Children's Museum of Indianapolis

### Eternal Empire

Although this section of the exhibit, *National Geographic Treasures of the Earth*, focuses largely on the Terra Cotta Army that the First Emperor buried in his tomb complex, they are by no means the only objects meant to accompany him into the next world. Archaeologists have discovered an array of sculptural figures and objects buried throughout the extensive complex. In addition to the warriors, archaeologists have also uncovered statues of acrobats, horses, grooms, chariots, court officials, musicians, and bronze birds. The writings of Sima Qian, a historian writing about the First Emperor about 100 years after his death, also reveal insights into what might be found inside the as-yet-unexcavated burial mound. Sima Qian wrote that the emperor's burial mound contained a re-creation of his kingdom in miniature, complete with palaces, rivers, the stars in the night sky, and officials to help him run his eternal empire.

## Grades 3–5 and 6–8 Procedures

### Discover

- Ask students to summarize what they have learned about the Terra Cotta Warriors and the First Emperor.
- Explain to students that although the Terra Cotta Warriors are quite famous, they are not the only artifacts found in the emperor's tomb complex. Ask students what else might be found there.
- Divide students into groups of four or five and have them research the other items found in the complex and/or items that might yet be found, based on Sima Qian's description. There are many books, children's magazines, and websites that can be used to find additional information on the tomb complex. See pages 78–82 for suggested resources.
- Have students record their findings on the graphic organizer on page 54.

### Explore

- Explain that archaeologists do not always find definite answers in the artifacts and clues they uncover. Many times, archaeologists can only **interpret** what they have found.
- Explain that an interpretation is a type of explanation based on **inferences** drawn from an analysis of all of the evidence available. These explanations are a kind of guess, but a guess based on the evidence.
- Have students examine all of the evidence they have uncovered in their research about the contents of the First Emperor's burial complex.

## Important Decisions

The First Emperor included each of the artifacts in his burial complex for a reason. It is not possible to re-create the entire world, so choices had to be made about what to include and what to leave out. What the emperor chose to include must say something about what was important to him. Archaeological interpretation of this evidence can give us a better idea about how the emperor saw his world.

### Grades 3–5 Academic Standards National Standards

**Social Studies** — Standard II: Time, Continuity & Change; Standard III: People, Places & Environments

**Visual Arts** — Standard 1: Understanding and applying media, techniques, and processes (a, b, c); Standard 2: Using knowledge of structures and functions (a, c); Standard 3: Choosing and evaluating a range of subject matter, symbols, and ideas (b); Standard 4: Understanding the visual arts in relation to history and cultures (a, b); Standard 5: Reflecting upon and assessing the characteristics and merits of their work and the work of others (b); Standard 6: Making connections between visual arts and other disciplines (b)

### National Common Core State Standards

**English Language Arts** — 3.W.1, 3.W.4, 3.W.7, 3.W.10, 3.SL.1; 4.W.1, 4.W.4, 4.W.7, 4.W.10, 4.SL.1; 5.W.1, 5.W.4, 5.W.7, 5.W.10, 5.SL.1

### Indiana Academic Standards

**Visual Arts** — 3.1.2, 3.1.3, 3.6.2, 3.6.3, 3.6.4, 3.6.5, 3.6.6, 3.7.1, 3.7.4.3.8.2; 4.2.1, 4.6.2, 4.6.4, 4.6.6, 4.7.1, 4.7.4, 4.8.1; 5.6.2, 5.6.3, 5.6.4, 5.6.5, 5.6.6, 5.7.1, 5.7.4

**Social Studies** — 3.3.9, 3.4.2; 4.3.6, 4.4.1

### Grades 6–8 Academic Standards National Standards

**Social Studies** — Standard II: Time, Continuity & Change; Standard III: People, Places & Environments

**Visual Arts** — Standard 1: Understanding and applying media, techniques, and processes (a, b); Standard 2: Using knowledge of structures and functions (a, b, c); Standard 3: Choosing and evaluating a range of subject matter, symbols, and ideas (b); Standard 4: Understanding the visual arts in relation to history and cultures (a, b); Standard 5: Reflecting upon and assessing the characteristics and merits of their work and the work of others (c); Standard 6: Making connections between visual arts and other disciplines (b)

### National Common Core State Standards

**English Language Arts** — 6.W.1, 6.W.4, 6.W.7, 6.W.10, 6.SL.1; 7.W.1, 7.W.4, 7.W.7, 7.W.10, 7.SL.1; 8.W.1, 8.W.4, 8.W.7, 8.W.10, 8.SL.1

### Indiana Academic Standards

**Visual Arts** — 6.1.2; 6.6.2, 6.6.3, 6.6.4, 6.6.5, 6.6.6, 6.7.1, 6.7.4; 7.1.1, 7.2.1, 7.2.2, 7.3.2, 7.6.2, 7.6.4, 7.6.6, 7.7.1, 7.7.4; 8.1.1, 8.6.2, 8.6.3, 8.6.4, 8.6.5, 8.6.6, 8.7.1, 8.7.4

**Social Studies** — 6.3.11; 7.1.1

- Tell students that they are going to have to think like archaeologists to interpret the artifacts found at the tomb complex. What might each artifact say about what was important to the First Emperor? For example, what might the inclusion of acrobats indicate? It could suggest that entertainment was important to the emperor and he wanted to have entertainers with him for eternity.
- Students should complete their graphic organizers by filling in their interpretations of the artifacts they have listed.
- Have groups take turns reporting their interpretations to the class.
- It is important to note that that not all interpretations will be the same; that is acceptable. Different archaeologists often interpret the same evidence in different ways.
- When differences in interpretation occur, have students discuss the evidence that they used to make their interpretation.

### Grades 3–5 Dig Deeper

- Ask students to think about their own world—their home, school, and city. What parts of their world best represent what is important to them?
- Remind students that it is impossible to include everything from their lives in a miniature re-creation of it. They, like the First Emperor, would have to make choices about what is most important to them to represent their lives.
- Students should research their own communities to find what makes them functional, as well as what makes them unique, including geography, institutions, industries, stores, government, and recreational facilities.

- Have students create a list of eight to ten features that they would include in a miniature re-creation of their world. These things could be architectural (a sports fan might choose a football stadium), like the emperor's miniature palaces described by Sima Qian, or they could be favorite pets, like the emperor's bronze birds, or favorite entertainers, like the terra cotta acrobats.

## Grades 3–5 Assessment

### Investigate

#### “The Important Things in Life”

Using the previously developed list of features and group discussion as an aid, students will choose one feature that they think is the most important thing about their community. They will represent this feature as a small **sculpture**. Remind students that a sculpture is an artwork which has three dimensions: height, width, and depth.

- Students can select from a variety of materials, such as clay, paper, cardboard, wood, foil, foam, or found objects, depending on the type of object they want to create.
- Students should keep in mind that they are not limited to representing physical places or objects, like a building. For some students, the most important thing in their community may be an idea or a feeling. For example, a student might enjoy the sense of freedom he or she feels playing games in a local park. The student might represent the concept of freedom through a symbol, such as a bird or a soaring, wing-like form as the subject of the sculpture.
- When sculptures are complete, students should group them on a tabletop or other flat surface to create a small model of their community.

- Students should be able to discuss why the features they represented are important to them and the community as a whole.
- Each student should be able to write a brief critique explaining how their sculpture represents the feature they selected and why they chose specific materials and techniques. The critique should reflect upon and evaluate the effectiveness of the student's own work in conveying the idea he or she wished to communicate.

### Debriefing:

- Ask students if it was difficult to select one feature or idea that was most important. Do they think that the model they have created as a group is a complete representation of their community? What are some of the things they regret leaving out? Why did they have to make choices?
- Ask students: If future archaeologists were to discover this model of our community, what would they think? Would they be able to determine what was important to the people living here? What would be missing? How could archaeologists get a more complete picture of our community?
- Discuss students' impressions of the First Emperor's tomb. Place students in small groups to brainstorm some ideas of what kinds of things were left out of the First Emperor's representation of his world.
- Ask students: Do the clues that archaeologists have found or will find at the tomb of the First Emperor offer a complete view of his world? Is it possible to re-create every aspect of that world? Why not?

## Scoring Criteria

Each student will be evaluated on his or her ability to select one aspect of the community as a subject, create a sculpture, and write a brief critique evaluating the effectiveness of his or her artistic choices in communicating personal ideas. Each student will participate in group discussion to develop ideas and reflect on individual and group work. Students should be able to:

- Choose one feature that has personal and community significance
- Select appropriate media
- Construct a small sculpture
- Use elements (such as form, texture, and space) and principles (such as proportion, movement, and balance) of design in creating the sculpture
- Use different tools, techniques, and processes to communicate ideas
- Explain why the feature they selected to represent is important to them and to the community
- Write a self-assessment of at least three paragraphs reflecting on the effectiveness of their choices in communicating personal ideas
  - explain choices of subject, media, elements and principles of design, techniques, and other strategies
  - assess the outcomes of their work and discuss possible revisions or alternative choices
- Use effective writing processes, including constructing a draft and reviewing, editing, and revising the critique
- Demonstrate writing conventions, such as using complete sentences, appropriate punctuation, grammar, and spelling
- Participate in group discussion by contributing ideas and listening to others
- Demonstrate respect for personal work and the work of others

## LESSON TWO

### Scoring Rubric:

#### Remedial

The student constructs a sculpture but may be unable to represent a feature of the community. The student shows little attention to selection of media, elements and principles of design, tools, and techniques and may not be able to describe the idea he or she was trying to convey. The student does not write a self-assessment or writes a very brief statement consisting of only a few sentences. The student does not contribute to group work and discussion or does not contribute effectively.

#### Partial

The student constructs a sculpture representing a feature of the community but may have difficulty implementing ideas due to poor use of media, design, techniques, or processes. In class discussion, the student can describe the personal importance of the feature but may have difficulty explaining the significance of the feature to the community as a whole. The student writes a brief composition of less than three paragraphs but does not evaluate personal performance in creating the sculpture. For example, the student may explain his or her choice of subject but doesn't discuss the effectiveness of media, design, or processes in communicating ideas. The student doesn't reflect on how the work might be revised and improved. The student's writing does not show evidence of editing and revision and the composition contains numerous errors in sentence structure, grammar, and spelling. The student shows respect for others but makes minimal contributions to group work.

#### Essential

The student completes a sculpture representing a selected feature of the community. In class discussions, the student can explain both the personal and community importance of this feature. The student writes a self-assessment of at least three paragraphs reflecting on his or her work and discussing the selection of specific media, elements and principles of design, techniques, or processes. The student comments on how well his or her artistic choices convey the desired idea or ideas and discusses ways that the work could be revised or enhanced. The student's writing shows evidence of editing and revision so that there are few errors in organization, sentence structure, spelling, and grammar. The student is respectful of others and their work and makes good contributions to group work and discussions.

#### Exceptional

The student completes a sculpture that represents a specific feature of the community and effectively communicates the artist's ideas about its personal and collective significance. In class discussions, the student can explain his or her selection of subject matter and how the artwork was designed to communicate its meaning. The student thoughtfully evaluates his or her work in a critique of more than three paragraphs. The self-assessment discusses the idea or ideas the student intended to convey, explains how specific symbols, media, elements and principles of design, techniques, and processes were used to communicate those ideas. The student describes the process of creating the artwork, including ongoing assessment, alternative approaches, and revisions. The student evaluates the total result of these efforts and comments upon what he or

she learned and how this can be applied to future work. The student demonstrates careful attention to the writing process and uses editing and revision to polish writing and improve the organization of ideas. The critique is free of errors in sentence structure, grammar, and spelling. In group work, the student demonstrates respect for other artists and their work and makes significant contributions to discussions.

## Grades 6–8 Assessment Scoring Criteria

### Investigate

#### “The Important Things in Life”

Each student will be evaluated on his or her ability to make a thoughtful selection of one community feature as a subject, create a sculpture to convey a specific idea or ideas, and write a critique evaluating the effectiveness of his or her artistic choices in communicating meaning. Each student will contribute to group discussion to develop ideas and reflect on individual and group work. Students should be able to:

- Choose one feature that has personal and community significance
- Select media that are appropriate for expressing intended ideas
- Construct a small sculpture, revising and refining the work as necessary
- Apply and discriminate among elements (such as form, texture, and space) and principles (such as proportion, movement, and balance) of design in creating the sculpture
- Use symbols, metaphors, tools, techniques, and processes to communicate ideas
- Explain the context for their selection of subject matter and why the feature they chose to represent is significant to them and to the community.
- Write a self-assessment of at least five paragraphs reflecting on the effectiveness of their choices in communicating ideas. Students should
  - explain choices of subject, media, elements and principles of design, techniques, and other strategies
  - describe their criteria for excellence and how they revised and refined the artwork

- assess the outcomes of their work, discuss insights gained, identify possible additional revisions or alternative choices, and indicate how what they have learned may affect future work
- Use effective writing processes, including constructing a draft and reviewing, editing, and revising the critique
- Demonstrate writing conventions, such as using complete sentences, appropriate punctuation, grammar, and spelling
- Participate in group discussion by contributing ideas and listening to others
- Demonstrate respect for personal work and the work of others

## Grades 6–8 Scoring Rubric

### Remedial

The student constructs a sculpture representing a feature of the community but has difficulty selecting appropriate media and using elements and principles of design, tools, and techniques to express ideas. The student may be able to describe what he or she was trying to convey but may not be able to explain the personal or community context or intended meaning of the work. The student does not write a self-assessment or writes a brief statement consisting of only a paragraph or two. The self-assessment does not demonstrate attention to personal criteria for excellence or reflection on performance, and does not describe attempts to revise or refine work. The student does not contribute to group work and discussion or does not contribute effectively.

### Partial

The student constructs a sculpture representing a feature of the community but may have difficulty implementing ideas due to poor use of media, design, techniques, or processes. In class discussion, the student can describe the personal importance of the feature but may have difficulty explaining the significance of the feature to the community as a whole. The student writes a brief composition of less than five paragraphs but does not identify personal criteria for excellence or evaluate performance in creating the sculpture. For example, the student may explain his or her choice of subject but doesn't discuss the effectiveness of media, design, or processes in communicating ideas. The student doesn't reflect on how the work might be revised and improved. The student's writing does not show evidence of editing and revision and the composition contains numerous errors in sentence structure, grammar, and spelling. The student shows respect for others but makes minimal contributions to group work.

### Essential

The student completes a sculpture representing a selected feature of the community and uses symbols, media, design, and processes to communicate an idea or ideas. In class discussions, the student can explain both the personal and community context and meaning of the chosen feature. The student writes a self-assessment of at least five paragraphs reflecting on his or her work and discussing the selection of specific media, elements and principles of design, techniques, or processes. The student describes criteria for excellence in work, discusses attempts to revise and improve the artwork, and reflects on how

## LESSON TWO

well his or her artistic choices convey the intended meaning. The student's writing shows evidence of editing and revision so that there are few errors in organization, sentence structure, spelling, and grammar. The student is respectful of others and their work and makes good contributions to group work and discussions.

### Exceptional

The student completes a sculpture that represents a specific feature of the community and effectively communicates the artist's ideas about its personal and collective significance. In class discussions, the student can explain his or her selection of subject matter and how the artwork was designed to communicate its meaning. The student thoughtfully evaluates his or her work in a critique of more than five paragraphs. The self-assessment discusses the idea or ideas the student intended to convey and analyzes how specific symbols, metaphors, media, elements and principles of design, techniques, and processes were applied to communicate those ideas. The student describes the process of creating the artwork, including ongoing assessment, alternative approaches, and revisions. The student evaluates the total result of these efforts and comments on what he or she learned and how this can be applied to future work. The student demonstrates careful attention to the writing process and uses editing and revision to polish writing and improve the organization of ideas. The critique is free of errors in sentence structure, grammar, and spelling. In group work, the student is respectful and supportive of other artists and their work and makes significant contributions to discussions.



### Online Connection

Be sure to visit the Teacher Community of Inquiry at [TCMTeachers.org](http://TCMTeachers.org) for more resources on the First Emperor's Terra Cotta Warriors and early Imperial China, and to view student work or submit your own students' work for others to see what you have accomplished in your own classroom. Share your thoughts on these experiences or share how you may have adapted them for your students.



C. Blänsdorf, Technische Universität Muenchen, "China-Project"

*The paint on these warrior replicas is based on the analysis of paint fragments found on the real clay warriors. All of the warriors would have had such vibrant colors.*

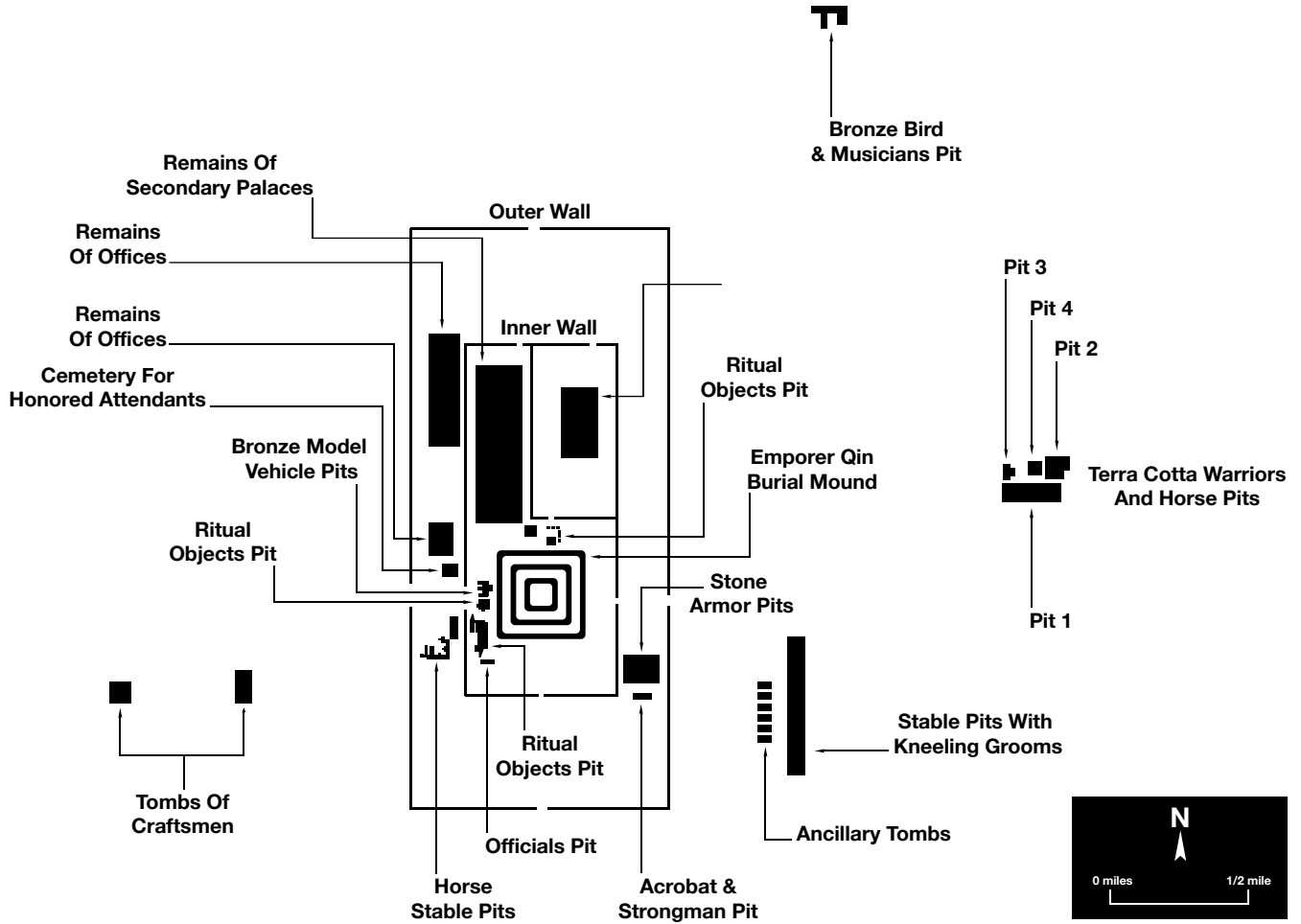
### The Emperor's Army . . . or Is It?

New discoveries and new theories can change what we believe about the past at any time. Scholars have long assumed the Terra Cotta Army belonged to the First Emperor, but a recent theory put forward by historian Chen Jingyuan suggests otherwise. This theory proposes that the warriors were actually built by one of the First Emperor's ancestors, the Empress Xuan, due in part to their colorful appearance as opposed to the First Emperor's known preference for black. Which theory is correct? There is no way to know for sure at this time, but perhaps a future archaeological discovery will shed more light on the subject.

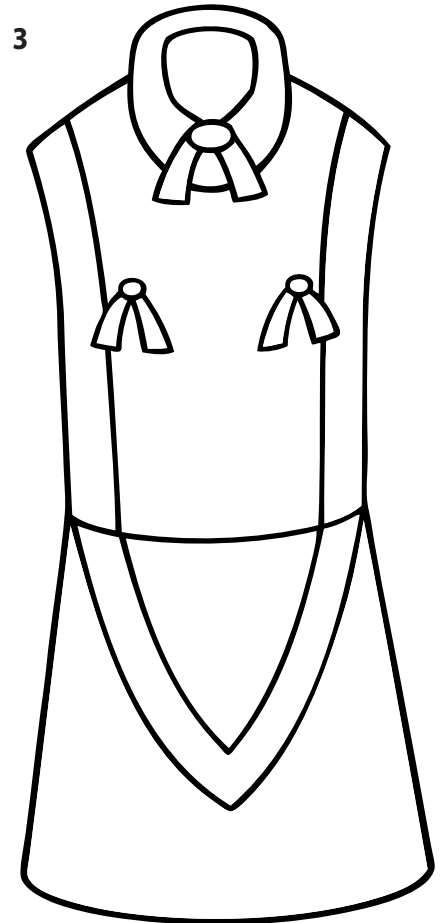
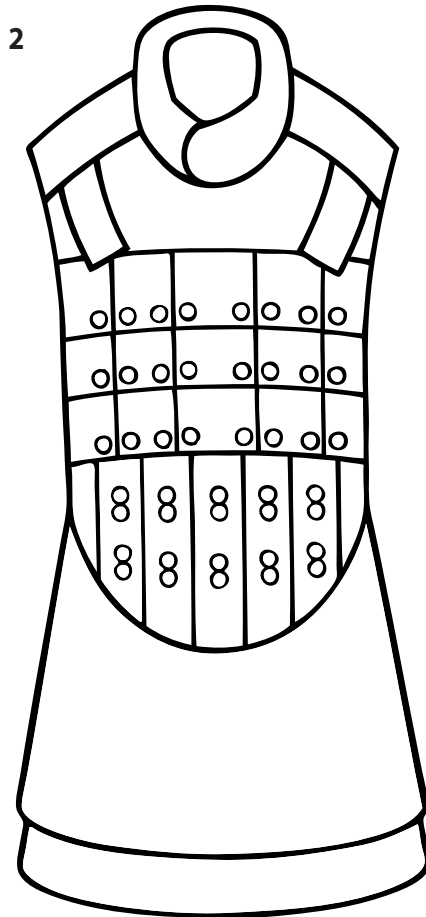
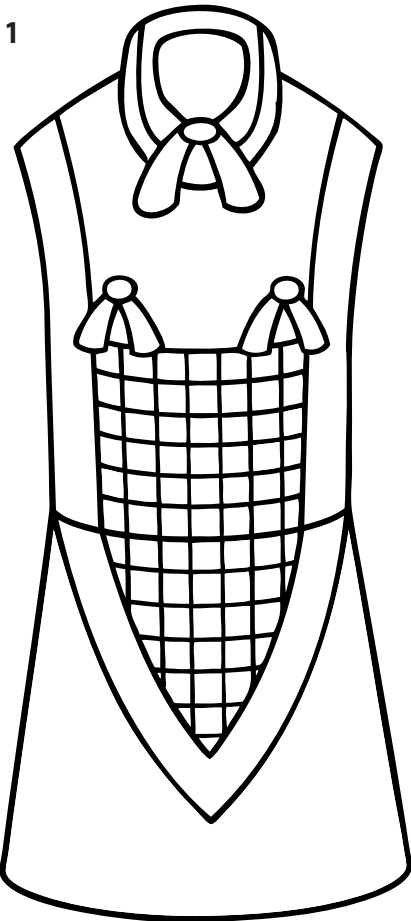
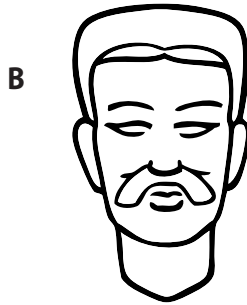


Student Handout

# Xi'an Region Archaeological Map

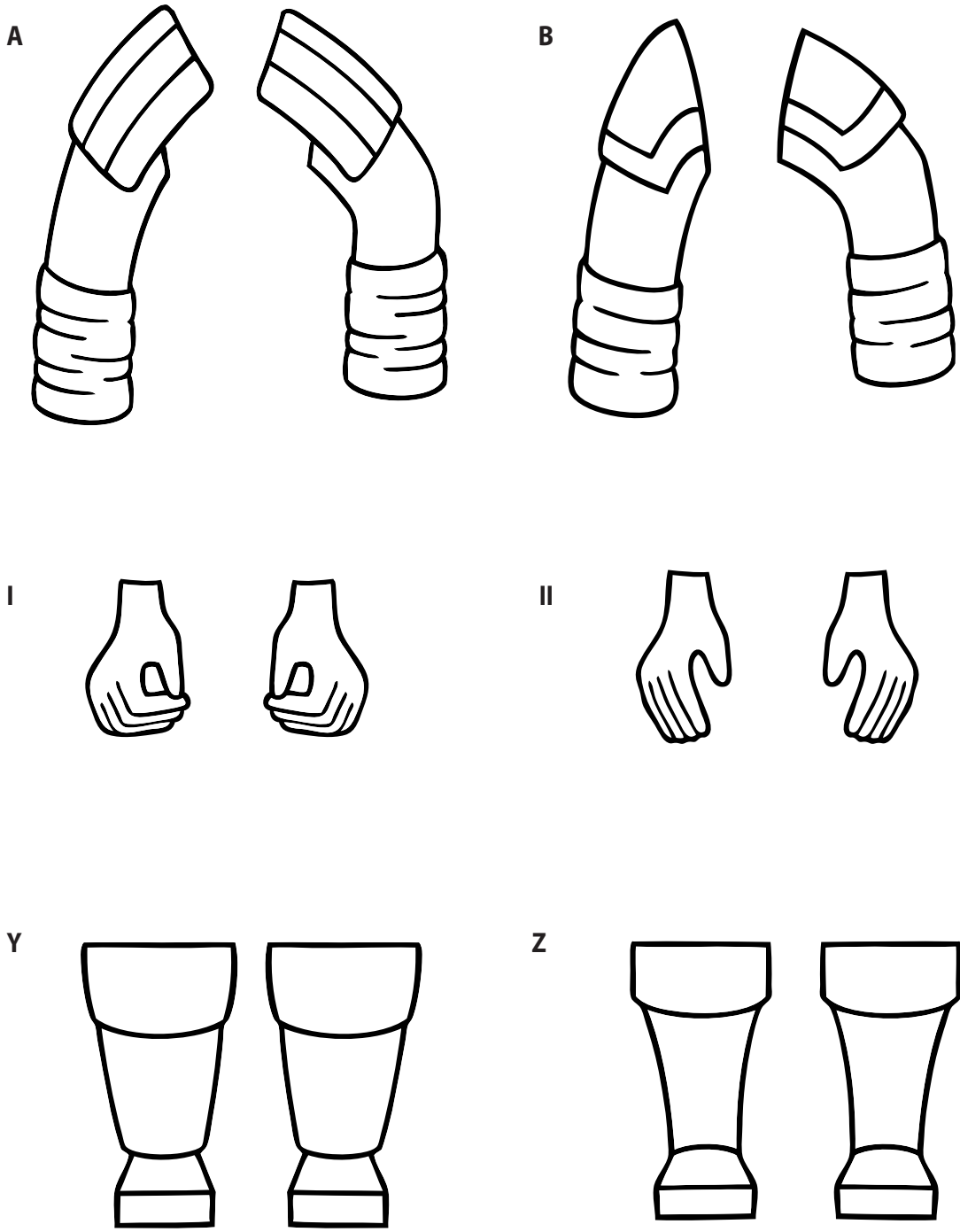


**Grades 3–5 Warrior Parts**



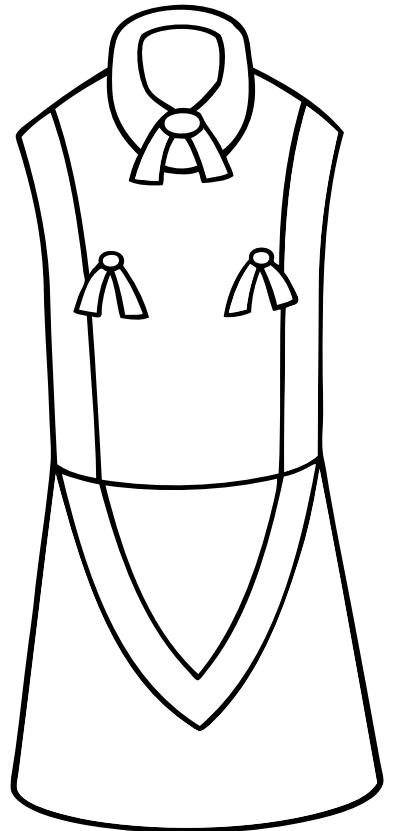
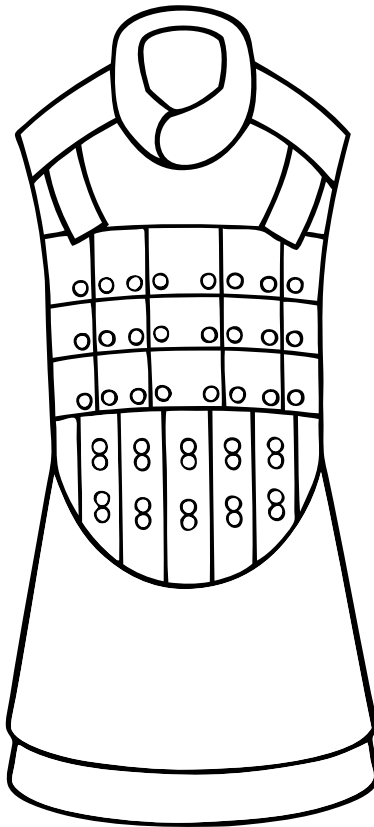
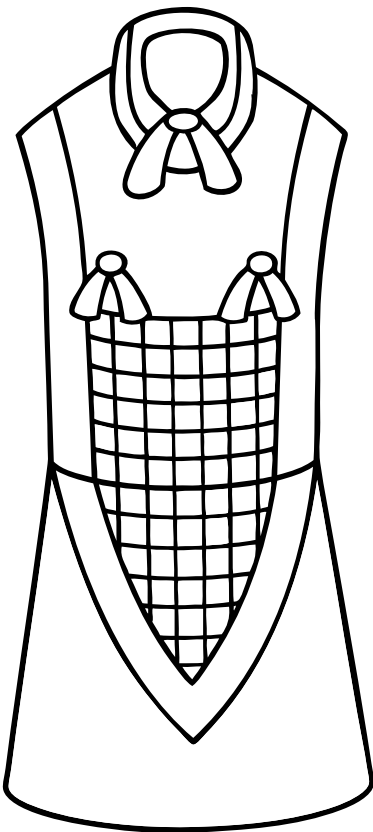
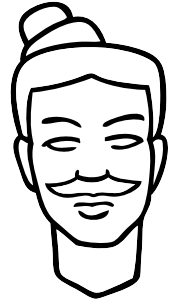
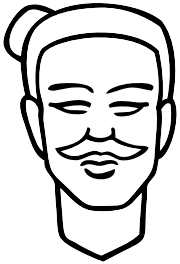
Student Handout

**Grades 3–5 Warrior Parts**



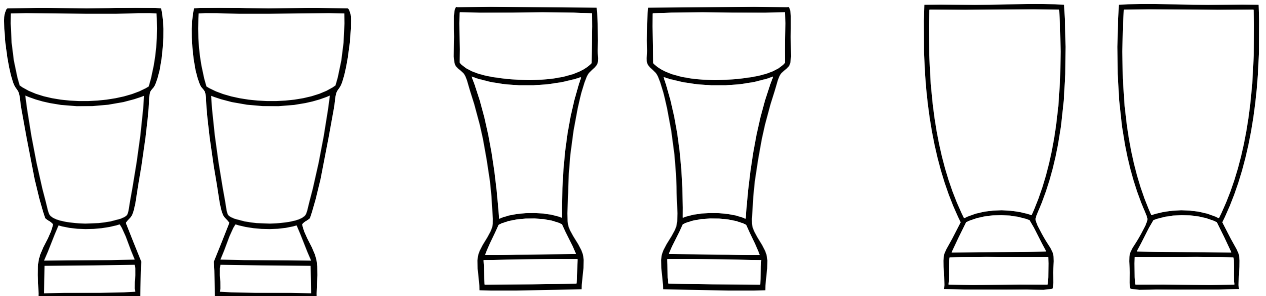
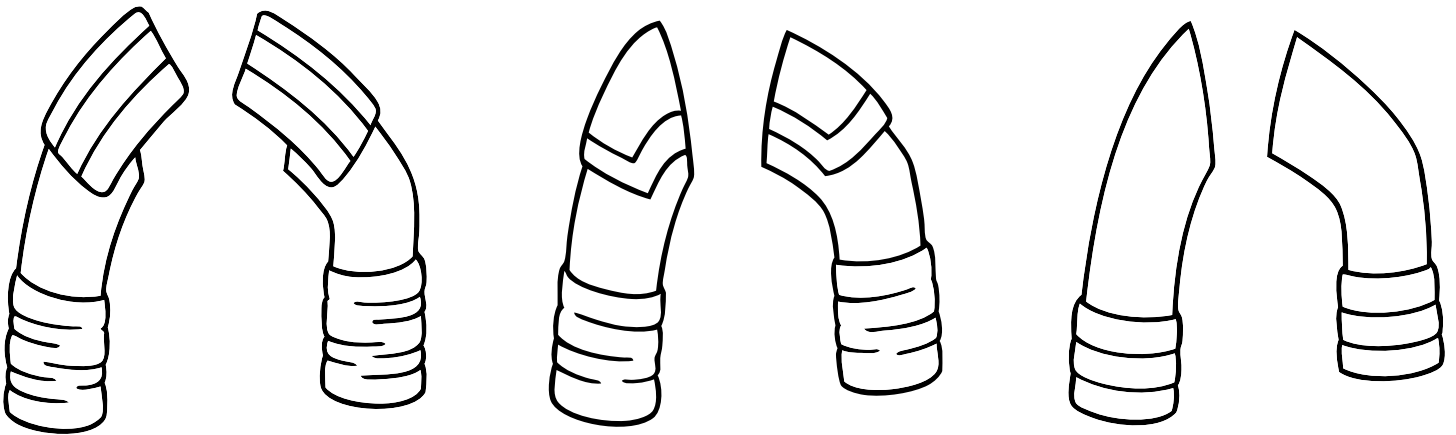
Student Handout

**Grades 6–8 Warrior Parts**



Student Handout

Grades 6–8 Warrior Parts



Student Handout

**An Emperor's Treasures**

List artifacts and features found in and around the site of the First Emperor's burial mound.	What might these artifacts tell us about the First Emperor, his world and what was important to him?

## Lesson 3: Treasures Under the Sea



Courtesy Indiana University

### Objectives

#### Students will

- Use critical thinking to solve a practical problem
- Continue to develop objectives from Lesson 1
  - Explain why archaeology is a type of science
  - Describe how archaeology contributes to what we know about the human past
  - Practice skills necessary for archaeology
  - Begin to think like archaeologists
- Locate the site of the shipwreck on a map
- Identify a variety of materials that would have been aboard a 17th-century ship
- Explain in general terms what happens to artifacts left under water
- Research and present a proposal for an expedition to solve an archaeological mystery



### Key Challenge in the Exhibit Space:

What ship is this? Who sailed it?  
What happened to it?

In several ways, archaeological studies under water are quite different from the types of archaeology practiced at the other two sites featured in this exhibit. Despite these differences, many of the same archaeological principles still apply. In this lesson, students will learn about the unique challenges of underwater archaeology with particular attention to the ship site featured in the exhibit, *Captain Kidd's Cara Merchant*, also known as the *Quedagh Merchant*. Students will also learn about the clues underwater archaeologists have used to identify the wreck of the *Cara Merchant* and tell its story.

In this lesson, students will learn about Captain Kidd and his history, leading to the taking of the *Cara Merchant* and his eventual conviction on charges of piracy as well as to evidence that he may have been innocent of the charges. Students will also hear about the fate of the ship—that it was unloaded and set adrift on fire, its final resting place unknown until its discovery by local divers off the coast of the Dominican Republic and investigation by underwater archaeologists from Indiana University.



### You Will Need

#### Materials

#### Grades 3–5 and 6–8

- bucket
- clear pan
- pennies (5 to 7 per group)
- sand
- water
- 60 cc syringes (no needles)
- straws
- brushes
- trowels
- other tools as appropriate
- construction paper
- sponges
- pipe cleaner
- boiling water
- borax
- string
- jar
- pencil
- goggles
- gloves

## LESSON THREE



### DIG THESE WORDS!

- concretions
- corrode
- current
- in situ
- marine
- material culture
- pirate
- privateer
- stereotype
- terrestrial

### Teacher Tip

Have students think of some additional pirate stereotypes and conduct research to determine which have a basis in fact and which are pure Hollywood fiction.

### Focus Questions

- How is underwater, or **marine**, archaeology different from **terrestrial** (land) archaeology?
- What is the identity of the ship discovered wrecked off the coast of Catalina Island?
- How do archaeologists know what ship it is?
- Who was Captain Kidd?
- What can this wreck tell us about the ship and its history?



### Dig Deeper with the Online Module

Visit the online module to learn more about the techniques and processes of archaeology. Discover how archaeologists have used these techniques to reveal the identity of Captain Kidd's lost ship, the *Cara Merchant*.

[childrensmuseum.org](http://childrensmuseum.org)

### Fact vs. Fiction

We all know what pirates looked like, right? Peg legs, gold hoop earrings, and the skull and crossbones. Think again.

These are **stereotypes** of fictional pirates, from fantastical stories to Hollywood movies, coming from such classics as Robert Louis Stevenson's *Treasure Island* and J. M. Barrie's novel *Peter Pan* and the Disney movie of the same name, to the more recent *Pirates of the Caribbean* franchise. Real pirates needed to be nimble on their feet to sail the ship and fight when necessary, so no peg legs allowed. Gold hoop earrings would just get in the way and catch on clothes or sail rigging, so would not have been practical to wear. Although many pirates did use flags, the skull and crossbones design we are most familiar with was used by only a few pirates.





## Experience 1: Excavating and Mapping Under Water



Courtesy Indiana University

A researcher from Indiana University uses an underwater metal detector to investigate the site of a shipwreck off the coast of the Dominican Republic.

It may seem obvious, but excavating an archaeological site under the waves is very different from excavating a site on dry land. For one thing, the type of site is different. On land, a site may have been occupied repeatedly over many years, creating a rich archaeological treasure-trove that may extend inches, feet, or even meters below the surface. Underwater sites, on the other hand, tend to represent a single event, like a shipwreck, preserving a brief snapshot of time. A land site might be buried and remain undisturbed for hundreds or even thousands of years. Underwater sites, on the other hand, are subjected to the constant effects of moving water and drifting sand. Not only are the sites different, but many of the techniques used are different, too. In this experience, students will consider ways in which excavating an underwater site is different from excavating a terrestrial site. Through experimentation, students will discover new techniques that are important when dealing with this unique kind of site.

### Grades 3–5 Academic Standards

#### National Standards

**Social Studies** — Standard II: Time, Continuity & Change; Standard III: People, Places & Environments

**Geography** — Standard 1: How to Use Maps and Other Geographic Representations, Tools, and Technologies to Acquire, Process, and Report Information from a Spatial Perspective

#### National Common Core State Standards

**English Language Arts** — 3.SL.1, 3.SL.3; 4.SL.1, 4.SL.3; 5.SL.1

#### Indiana Academic Standards

**Science** — Process Standards: The Nature of Science; The Design Process

**Social Studies** — 3.3.3; 5.1.2, 5.3.1

### Grades 6–8 Academic Standards

#### National Standards

**Social Studies** — Standard II: Time, Continuity & Change; Standard III: People, Places & Environments

**Geography** — Standard 1: How to Use Maps and Other Geographic Representations, Tools, and Technologies to Acquire, Process, and Report Information from a Spatial Perspective

#### National Common Core State Standards

**English Language Arts** — 6.SL.1; 7.SL.1; 8.SL.1

#### Indiana Academic Standards

**Science** — Process Standards: The Nature of Science; The Design Process

**Social Studies** — 6.3.1, 6.3.2, 6.3.11

## LESSON THREE

### Procedures

#### Discover

- Begin by having students find the Dominican Republic on a map or globe.
- Explain that this country occupies half of an island in the Caribbean Ocean and is located near the intersection of 20° N and 70° W.
- Ask students what they know about this area. Explain that this part of the Caribbean was once very important to early colonization of the New World and that the capital, Santo Domingo, is the oldest continuously inhabited European settlement in the Americas.
- Have students find Santo Domingo within the Dominican Republic on the map or globe and determine its position in longitude and latitude.
- Have students brainstorm some of the advantages of the location of the island. For example, it would have served as a convenient stopping point for trade between Europe (particularly Spain) and points in Central America and South America.

### Student Reading

#### The Truth About Captain Kidd

Who was the real Captain William Kidd? History remembers him as a fierce pirate, but did he really deserve his bad reputation? William Kidd was a Scottish sailor, but experts do not know much about his early childhood and young adulthood.

In 1691, around the age of 45, he married a wealthy widow in New York and settled down to live the life of a respectable merchant. However, his thirst for adventure and restlessness led him back to sea.

In 1695, Kidd decided to become a **privateer**—someone on an armed private ship licensed to attack and rob enemy ships. He planned to find pirate ships and capture their treasures, splitting the profit among himself and his crew and the financial backers who sponsored his voyage. King William III of England even signed Kidd's commission and claimed 10 percent of whatever Kidd took for himself. Being a privateer was legal but dangerous work.

Kidd put together a crew in England and set sail for pirate waters. Unfortunately, the English navy stopped his ship and



forced most of his crew to join them, leaving Kidd to find anyone he could to run his ship. Some of these new sailors were pirates. The voyage did not go well. Kidd had trouble finding pirates to attack and his crew was growing restless. They tried to turn against Kidd in a mutiny. In a fight with one crew member, Kidd struck him in the head with a bucket, killing him.

Eventually, the crew convinced Kidd to attack a ship flying a French flag. England and France were at war, so it was legal for an English privateer to attack a French ship. What Kidd did not know was that the ship's captain was English and it was owned by Armenians. Kidd took the ship and renamed it the

*Cara Merchant*. The English financial backers of Kidd's expedition, who had lost money, called Kidd a pirate and a warrant was issued for his arrest. When Kidd found out, he hid the *Cara Merchant* on the island of Hispaniola (in the present-day Dominican Republic) and headed home to clear his name. He gave the ship's French papers to one of his backers for safekeeping.

Kidd considered himself a privateer and thought the ship was French, which would have made what he did legal. But he was eventually taken to London and tried for piracy and the murder of the crewman he killed with a bucket. Kidd argued that he was no pirate, and offered to show the ship's papers as evidence. However, Kidd was betrayed. The papers had vanished, leaving no evidence left to prove his story. He was found guilty and was executed in 1701. His crew, meanwhile, removed everything of value from the *Cara Merchant* and destroyed the ship. It was last seen ablaze, drifting down a river toward the Caribbean Sea.

The ship's papers, the ones that identified the ship as French, were found more than 200 years later, misfiled with other government papers in a London archive.

### Explore

- Have students read *The Truth About Captain Kidd* and review the evidence about what happened to the *Cara Merchant*.
- Ask: Where was the ship last seen? Where would be the first place you would look to find the ship?
- Explain that people have been looking for Captain Kidd's ship for many years, almost since the day it sunk. Some people believed that there would be treasure left on board. Others just wanted to find a "pirate ship." These people most often looked in the river, since that was the last place the ship was seen.
- Ask: If the ship was not in the river, where might it have gone?
- Have students look at the map on page 72. Explain that maps play many important roles in archaeology and can help archaeologists solve mysteries about the past.
- Ask students to look at the direction of the **current** indicated on the map.
- What clues could this current offer about where Kidd's ship ended up?

### Dig Deeper

- Tell students that a shipwreck was discovered off the coast of Catalina Island. Could this have been the long-lost *Cara Merchant*?
- The direction of the currents indicated on this map was one important clue used to piece together the story of the *Cara Merchant*. If the ship had floated down river and out into the sea on this strong current as it burned, it would naturally come to rest at the location of the newly discovered shipwreck. But this clue alone is not enough to determine that the ship is the *Cara Merchant* and not some other vessel.

- Once the shipwreck was discovered, archaeologists needed to excavate the remains to uncover clues about the identity of the wreck.
- Ask students to think about some of the challenges of excavating under water.
- Explain that students will conduct an experiment to determine the best way to overcome the challenges of underwater excavation.

### Investigate

- Give students their own "excavations" in a **bucket** by adding an inch or two of sand to the **clear pan**. Bury a few items (such as pennies) in the sand and fill the pan with water.
- Provide a variety of tools to use to excavate the items in the sand. These tools can be those used in land archaeology (brushes, trowels, picks, etc), as well as tools that could be unique to the water environment. Be creative, but be sure to include something that will blow water and sand (such as a bulb turkey baster) and one that will suck water and sand (like a 60cc syringe, no needle).
- Present students with a challenge: uncover the hidden items using the tools available, but do not disturb the objects themselves, as an archaeologist would want to document the find **in situ**.
- Distribute the data collecting handout on page 73. Students should begin by filling out the fields at the top: "The Challenge" and "Identify the Problem."
- Students should hypothesize which tools will be most effective and test these hypotheses through experimentation.
- Have students experiment with the different tools, using different methods and document any advantages or disadvantages to the

- different tools using the handout. For example, what happens when they try to brush the sand away? The brushed up sand will likely cloud the water and float back onto the object.
- Discuss which tools and methods were the most efficient at removing the sand without disturbing the artifact.
- Have students take a few minutes to reflect on this experience and record their thoughts in their Treasures Classroom Notebooks.

## LESSON THREE



### On-Site: Shifting Waves

Unlike many archaeological sites, shipwrecks by their very nature are deposited while in motion. This motion has a great impact on the site left behind. In the case of the *Cara Merchant*, the ship was set on fire and set adrift in a river. Following the natural curve of the land and the direction of the current as it flows out of the river and away from the island, the ship came to rest in a mere 10 feet of water off the coast. The location of this wreck is exactly where one would expect it to be, given the currents in the area. Wave action over the years has continued to shape the site, breaking up the wreck and distributing artifacts along the course of the current.



Charles Beeker, Indiana University

### Lost Ship Found

There were several important clues that led to the identification of this shipwreck as that of the *Cara Merchant* by Professor Charles Beeker and his associates. Beeker's analysis of the cannon recovered from the wreck site helped to reveal the wreck's age because the cannon was of a style common to the late 17th century. Fragments of wood hull turned out to be teak, an exotic wood for a ship found in the Caribbean. Analysis also showed that the teak wood was held together by "rabbited" joints, an unusual construction technique. Teak wood and "rabbited" joints were techniques used by shipbuilders in India, and historical records indicate that the *Cara Merchant* originated in India. This evidence added to the clues discussed in Experience 1 make a convincing argument that this ship is indeed the wreck of Captain Kidd's *Cara Merchant*.

## Experience 2: Treasures in the Rough



The Children's Museum of Indianapolis

*Many types of artifacts might be recovered from underwater shipwrecks, from cannons and anchors to these delicate pieces of Chinese porcelain.*

Artifacts recovered from underwater sites often appear very different from similar objects found on land. Dirt and decay are problems for all artifacts, regardless of where they are deposited, but the nature of saltwater adds a new dimension to this problem in ocean wreck sites. These factors contribute to the survival and conservation needs of these artifacts. Waterlogged organic materials must be properly treated to prevent irreparable damage. Many metal artifacts **corrode** or become encased in rock-hard **concretions**. In this experience, students will make observations and conduct an experiment to demonstrate the effect saltwater has on artifacts.

### Grades 3–5 Academic Standards

#### National Common Core State Standards

English Language Arts — 3.SL.1, 3.SL.3; 4.SL.1, 4.SL.3; 5.SL.1

Indiana Academic Standards  
Science — Process Standards: The Nature of Science

### Grades 6–8 Academic Standards

#### National Common Core State Standards

English Language Arts — 6.SL.1; 7.SL.1; 8.SL.1

Indiana Academic Standards  
Science — Process Standards: The Nature of Science

## Procedures

### Discover

- Explain to students that the preservation of artifacts from underwater archaeological sites presents particular challenges.
- Have students give some examples of how underwater archaeological sites and terrestrial archaeological sites are different.
- Ask: How might those differences affect the artifacts left behind at a site?
- Have students think about different kinds of materials that might be found on a ship.
- Ask: Would water affect all artifacts in the same way?

### Explore

- Tell students that they are going to work in teams to conduct an experiment to see how water affects a variety of materials.
- Divide students into teams of four or five and distribute the handout on page 73 to each team.

## LESSON THREE

- Provide each group with a shallow pan of water, a penny, a sponge, and small piece of paper. These three objects represent types of materials that might be found on a ship: metal, organic materials that absorb water, and paper from documents.
- Instruct students to record their observations of these three materials on their handout, using appropriate tools to measure their size. Remind students that making careful observations is an important part of archaeology and of science in general.
- Have students place these objects in the water and leave them for 24 hours.
- Have students remove the objects from the water, placing them on paper towels to help absorb the excess water (hint: allow the sponge to naturally drip some of its excess water, but do not squeeze it). Students should record their observations on their handout.
- Wait another 24 hours to allow the objects to dry and have students record their observations. Repeat once more after another 24 hours.
- Ask students to review their observations and answer the following questions: How did the water affect the penny? The sponge? The piece of paper?
- Explain that the sponge demonstrates what happens to a piece of wood when it is submerged in water and then allowed to dry out. Over time, wood under water absorbs water, destabilizing the natural structure of the wood. Like the sponge, saturated wood will collapse in on itself if it is simply allowed to dry out. During this process, wood can also crack and crumble, destroying the artifact.



Courtesy Indiana University

### Treasures on the Inside

Most metal objects, particularly iron, are highly reactive to saltwater. Although metal will rust when exposed to air, salts, and moisture present in terrestrial sites, the process is greatly accelerated in saltwater environments. Objects not only absorb salts in the water, but also the metal slowly leaches out of the object, causing it to corrode. In some environments, the situation is further complicated by living organisms, such as coral, that may grow on the artifacts. In the end, metal objects in saltwater sites become encased in hard shells, known as concretions. Sometimes, the metal object inside the concretion rots completely away, leaving nothing but a hollow void inside where the metal object once was.

### Dig Deeper

- Ask students to take a good look at the penny and their observations of it over the course of the previous experiment. Did it change?
- Have students think about ways that this experiment was different from what happens to real metal objects that are part of underwater excavation sites. Answers might include the amount of time the penny was in water and the type of water used (fresh water versus saltwater).
- Explain that the experiment has important limitations. Real metal objects from shipwrecks spend a long time in saltwater and, as a result, most of them change significantly.
- Explain to students that a second experiment will help illustrate this concept.
- Give each group of students a jar, a pipe cleaner, a pencil, and a length of string.
- Have each group twist the pipe cleaner into a shape and tie one end of the string to it. Have them tie the other end around the middle of a pencil.

**Teacher Tip**

As with any scientific experiment, it is important to take all necessary precautions to ensure the safety of the students. Proper protective gear, such as goggles and gloves, should be worn at all times while working with hot water and chemicals. Only an adult should handle and pour the boiling water. Students should be instructed to stir gently to avoid splashing the hot liquid or chemicals.

- Fill each jar with boiling water and have the students carefully add borax to the water one tablespoon at a time, stirring until it is dissolved. Use approximately 3 tablespoons of borax for every cup of water.
- Instruct students to stop adding borax when it is no longer dissolving. It is not a problem if a small amount of borax remains undissolved at the bottom of the jar.
- Have students lower their pipe cleaner shape into the water, submerging it completely in the solution. Instruct students to place the pencil over the mouth of the jar so that the pipe cleaner is suspended in the water.
- Students should record their predictions in their journals. What do they think will happen to their pipe cleaner?
- Leave the jars undisturbed overnight.

**Investigate**

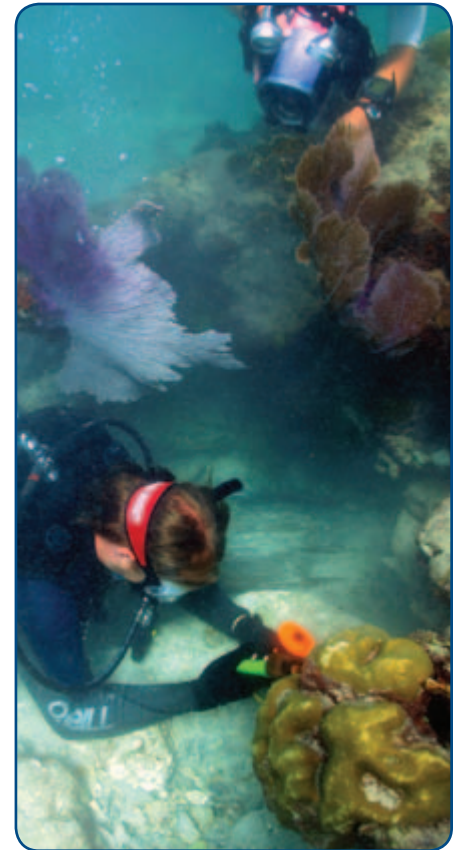
- Ask students to observe their pipe cleaner shapes in the jars now. How have they changed overnight?
- Have students speculate about what happened to their pipe cleaners.
- Explain that even though they cannot see it, the dissolved borax remains in the water and that these chemicals,

over time, re-formed as crystals on the submerged object, creating an outer coating over the surface of the object.

- Students should record the results in their journals.
- Ask: How is this similar to what might happen to a metal object left in saltwater for too long?
- Explain that even though sea water looks transparent, there are salts and chemicals dissolved in it, just like there was borax dissolved in their water. Over time, these salts and other chemicals react with the metal, depositing a rock-hard coat of salt, minerals, and corroded metal over the surface of the artifact. This hard coating is known as a concretion. Concretions may cover only parts of an artifact or may obscure the original object completely.
- Have students try to guess the original shapes of their classmates' pipe cleaners underneath the crystals.
- Have students discuss the following question: What kinds of challenges do concretions pose to archaeologists as they study the artifacts recovered from underwater archaeological sites?
- Allow time after discussion for students to record their thoughts in the Treasures Classroom Notebooks.

**Grade 6–8 Extension**

There are a number of ways that science can help preserve the fragile artifacts found in underwater archaeological sites. Have students pick a type of material—for example, wood or metal—and research ways that conservators can help preserve it. Have students imagine that they are conservators who have been given an artifact to treat. It is their job to write a report outlining their recommendations for the preservation of the artifact based on the research they have conducted.



Courtesy Indiana University

*Researchers investigate the site of the Cara Merchant, now home to an array of beautiful and rare corals.*

### Experience 3: Everyday Treasures



Courtesy/Indiana University

Calm Caribbean waters conceal the archaeological treasure just under the surface.

Unlike the two terrestrial sites featured in *National Geographic Treasures of the Earth*, many underwater archaeological sites are unplanned. In most cases, ships either sink accidentally or, as in the case of the *Cara Merchant*, after a hasty abandonment. In this experience, students will consider the different types of artifacts that might be found on underwater shipwrecks and what these objects can reveal about life onboard a ship. Students will conduct research to discover the kinds of artifacts that might be found on a 17th-century privateer's ship.

#### Grades 3–5 Academic Standards

##### National Standards

**Social Studies** — Standard II: Time, Continuity & Change

##### National Common Core

##### State Standards

**English Language Arts** — 3.W.1, 3.W.4, 3.W.7, 3.W.10, 3.SL.1; 4.W.1, 4.W.4, 4.W.7, 4.W.10, 4.SL.1; 5.W.1, 5.W.4, 5.W.7, 5.W.10, 5.SL.1

#### Grades 6–8 Academic Standards

##### National Standards

**Social Studies** — Standard II: Time, Continuity & Change

##### National Common Core

##### State Standards

**English Language Arts** — 6.W.1, 6.W.4, 6.W.7, 6.W.10, 6.SL.1; 7.W.1, 7.W.4, 7.W.7, 7.W.10, 7.SL.1; 8.W.1, 8.W.4, 8.W.7, 8.W.10, 8.SL.1

##### Indiana Academic Standards

**Social Studies** — 6.3.11

### Procedures

#### Discover

- Ask students to review how the two land sites featured in the exhibit differ from underwater archaeological sites. Some questions to prompt discussion: Why were these sites created? How were they created? Are they all intentional? Is the purpose of the sites different?
- Have students complete the graphic organizer on page 76.
- Note that the two terrestrial archaeological sites were intentionally created for use as tombs for deceased rulers, but that most underwater shipwreck sites, including the *Cara Merchant*, were created spontaneously (without planning) and before the wreck, these ships were designed to be used by living people.





The Children's Museum of Indianapolis

*This vessel, a type known as an "onion bottle," was discovered on a shipwreck off the coast of the Dominican Republic.*

### Everyday Objects

Ocean-going ships of the 17th century served many purposes, be they privateer, pirate, or merchant ships. Sailors not only worked on these ships, but they also called them home for extended voyages. Everything a sailor needed would have to be kept on board. When these ships went down, often in storms, there was little or no time to retrieve anything. A sailor would be lucky to escape with his life. Many of these everyday personal objects, such as forks and knives, cargo, navigation equipment, and ship's hardware, came to rest at the bottom of the sea, giving archaeologists insight into the lives of sailors from long ago.

- Have students think about how these differences affect the types of artifacts that might be present at the different sites and give some examples.

## Assessment

### Explore and Interpret

- Using these examples as a starting point, have students research objects used by sailors and merchants of the late 17th century, during the colonization period in the Caribbean and the New World. Encourage students to focus on the everyday items that might have been on board a ship of this time period. These objects are part of what is called the **material culture** of the time and offer archaeologists clues about life on a ship during that time.
- Each student should pick one object to focus their research on. Choices could include anything that might have been on a ship during the period, including navigational tools and charts, weapons, clothes, personal items, utilitarian tools, or cargo from the Far East meant for the markets of colonial settlements in North America.
- As they are conducting their research, have students complete the handout on page 74 with information including a description of the object and its uses, origin and history as well as all resources used in the research.
- There are many resources available for this research, including in print and online. See the Resources section on pages 78–82 for some ideas, and students also can use an online search engine under proper supervision to search such terms as "17th-century artifacts," "17th-century trade items," etc.

## Dig Deeper

- Have the students make a 3D re-creation of the object they researched, using whatever materials are available.
- Students should present their re-creation and their research to the class. Presentations should be clear and well-organized and can incorporate extra visual aids and resources to illustrate what they have learned.

## Investigate

- After the presentations, invite the class to gather their objects and research together to create their own "Treasures Museum" exhibit of life on board a late 17th-century ship.
- Ask students what these objects tell them about life on board ship during the late 17th century. If these objects were found on a shipwreck, what would an archaeologist be able to learn about the ship and the people who were on board?
- After discussion, have students record their thoughts about the "Treasures Museums" artifacts and what they would tell archaeologists about life on board ship in their notebooks. These notebooks entries should be no less than a paragraph long and reflect the concepts and vocabulary that students have learned throughout the unit.

## LESSON THREE

### Grades 6–8 Extension

- Remind students about what they learned in Experience 2 about artifact survival in an underwater environment. Many of the objects chosen by the class may not have been able to survive in a real underwater site. When an artifact is damaged or lost from an archaeological site, all of the information that it might have provided is lost as well. This can make the process of archaeological interpretation much more difficult.
- Have students identify which objects would most likely not survive under water, and remove those from the collection.
- Ask students to discuss what information is now missing from the artifact collection. How does this change what an archaeologist can learn about life on board this fictional ship?
- After discussion, have students record their thoughts in their notebooks. These notebook entries should be no less than a paragraph long and reflect the concepts and vocabulary that students have learned throughout the unit.

### Scoring Criteria

After completing the experiences in Lesson 3, each student will be evaluated on the ability to use what he or she has learned in research on the types of artifacts that might be found on a shipwreck and to speculate what archaeologists can learn from them about people of the past. Students should be able to:

- Identify a variety of artifacts that might be found on a sunken ship of the late 17th century
- Conduct research on a specific artifact
- Use and cite a variety of resources to

research the topic

- Complete an accurate information sheet on the artifact
- Produce a replica of the artifact based on research
- Use listening and speaking skills to communicate ideas effectively
- Show respect for other students
- Use knowledge of archaeology concepts, vocabulary, and the work of archaeologists to support interpretations
- Grades 6–8: Identify artifacts that would not survive and postulate how the loss of these objects might change an archaeologist's interpretation

### Scoring Rubric

#### Remedial

The student does not identify an appropriate artifact for research. The student does not conduct the research necessary to complete the artifact information sheet or does so in a minimal way and does not provide documentation of sources used. Some areas of the information sheet are left blank or answered incompletely. The student's replica demonstrates a lack of effort or understanding of the artifact, as it may be sloppy or lack characteristic features. The student presents his or her information to the class, but may fail to speak clearly, face the audience, and listen to others when they speak. The student does not enhance the presentation with supplementary visual aids or resources to communicate ideas more effectively. The student's notebook entry does not use appropriate vocabulary and may demonstrate a limited understanding of the concepts addressed in the unit. A student in Grades 6–8 fails to explain how the loss of particular artifacts would affect the interpretation of the collection.

#### Partial

The student identifies an appropriate artifact for research, but does not conduct the research necessary to complete the artifact information sheet or does so in a minimal way and does not provide documentation of their sources. No areas of the information sheet are left blank, but some may be answered incompletely. The student's replica demonstrates a lack of effort but does show some understanding of the artifact. The replica may be sloppy but it does not lack any major characteristic features. The student presents his or her information to the class, but may fail to speak clearly or face the audience. The student may need prompting to listen to others when they speak. The student does not enhance the presentation with supplementary visual aids or resources to communicate ideas more effectively. The student's notebook entry uses some appropriate vocabulary and may demonstrate a limited understanding of the concepts addressed in the unit. A student in Grades 6–8 is unable to explain how the loss of particular artifacts would affect the interpretation of the collection.

#### Essential

The student identifies an appropriate artifact for research and conducts the research necessary to complete the artifact information sheet. The student may not accurately represent all sources cited. No areas of the information sheet are left blank and each area is addressed adequately. The student's replica demonstrates effort and understanding of the artifact. The replica may be a little sloppy but it demonstrates all of the characteristic features of the artifact. The student presents his or her information to the class, speaking clearly, but may have trouble facing the audience. The student listens to others when they speak. The student may not enhance the

presentation with supplementary visual aids or resources to communicate ideas more effectively. The student's notebook entry uses some appropriate vocabulary and demonstrates an understanding of the concepts addressed in the unit. A student in Grades 6–8 is able to explain how the loss of particular artifacts would affect the interpretation of the collection.

### Exceptional

The student identifies an appropriate artifact for research, and conducts the research necessary to complete the artifact information sheet. The student cites all sources of information accurately. The information sheet is completed with detail and each area is addressed. The student's replica demonstrates great effort and a thorough understanding of the artifact. The replica quality demonstrates the effort put into it and great attention is paid to all of the characteristic features of the artifact. The student presents his or her information to the class, speaking clearly and facing the audience. The student listens to others when they speak. The student enhances the presentation with supplementary visual aids and/or resources to communicate ideas more effectively. The student's notebook entry uses appropriate vocabulary and demonstrates a clear understanding of the concepts addressed in the unit. A student in Grades 6–8 is able to clearly identify what information is lost with particular artifacts and how the loss of that information changes the interpretation of the collection as a whole.



Courtesy Indiana University

### Preservation for the Future

There are plans to transform the site of the *Cara Merchant* into an underwater nature park. Students can learn about plans for the underwater park through online resources.

### Extending Experiences

#### Memorials Under the Sea

Most shipwrecks were accidental and occurred while sailors were on board. In many cases, they died as a result of the wreck. Some people view these wrecks as a kind of gravesite and are uncomfortable with the idea of disturbing them; they argue that such sites should be left as memorials instead. Have students consider the following question: Can an underwater shipwreck site be a memorial? Students should research examples, including the *Titanic* and the *Arizona*. Have students discuss the arguments for and against treating shipwrecks as memorials and not as archaeological finds. There are no right answers in this ongoing and difficult debate.



### Online Connection

Be sure to visit the Teacher Community of Inquiry for more resources on Captain Kidd and the *Cara Merchant* and to view student work or submit your own students' work for others to see what you have accomplished in your own classroom. Share your thoughts on these experiences or share how you may have adapted them for your students.

[tcmteachers.org](http://tcmteachers.org)

### Culminating Experience and Assessment: Think Like an Archaeologist



Courtesy Kristi Jarrett

*Students excavating a site in Illinois know that it takes hard work to become archaeologists.*

Throughout this unit of study, students have learned about archaeology as a discipline as well as what archaeology has helped uncover about the three sites featured in the exhibit *National Geographic Treasures of the Earth*. Students have learned how archaeologists use maps to learn about sites, that ancient Egyptian hieroglyphics decorate the tomb of Seti I, how thousands of unique clay warriors were created for the First Emperor, and the effects of the environment on the survival of a variety of artifacts. In many of these experiences, students have learned how archaeologists uncover the clues that tell us about people of the past. In this final experience, students will contemplate some of the as-yet-unsolved mysteries of the human past and prepare a proposal to launch an archaeological expedition to help solve the mystery.

Archaeology is a highly competitive field, with more researchers than there are research funds to go around. Often, archaeologists have to submit their ideas for an expedition to grant-making organizations in order to receive funding. In the culminating experience, students will present their expedition proposals to a jury made up of students from another class or special guests, such as archaeologists from a nearby university, community members, school administrators, other teachers, local historians, or librarians, who will pick one proposal to “fund.”

### Procedures

#### Discover

- In this experience, ask students to imagine that they are archaeologists preparing to undertake an archaeological expedition. They will work in teams to consider all of the aspects of such an undertaking and write a persuasive proposal outlining their proposed expedition.
- Archaeological expeditions are extremely expensive propositions. Explain to students that archaeologists often have to compete for funding dollars to conduct their research. In this experience, each group will present their expedition proposals to try to win “funding” to research their archaeological mystery.
- Let students know that they will be presenting their proposals to an audience who will judge the submissions, and that only one proposal will be selected for “funding.” Make it clear to students that the audience selection will not affect the group’s final grade. Rather, groups will be assessed on the process of creating the proposal and the completeness of the final product. After all, many excellent archaeological expedition proposals

- fail to achieve funding in the real world due to stiff competition.
- To prepare to begin the proposals, have students reflect on how the practice of archaeology has helped them learn more about the three archaeological mysteries addressed in this unit of study and in the exhibit *National Geographic Treasures of the Earth*.
- Ask students if they think there are other archaeological mysteries out there waiting to be explored. Can they provide any examples?

### Into the Future to Find the Past

There are many mysteries of history that have yet to be fully explored, and new questions continue to arise to challenge what we thought we knew about the past. Archaeology can play an important role in answering these questions. What was the purpose of Stonehenge? What happened to Amelia Earhart? Who created the Phaistos Disc and what does it say? Where are Antony and Cleopatra buried? What happened to the people of Cahokia? How far into North America did the Vikings travel? What happened to the Lost Fleet of Columbus? Archaeologists and scholars continue to explore these questions through excavations and analysis. In fact, Professor Charles Beeker, director of Indiana University's Office of Underwater Science, in partnership with The Children's Museum of Indianapolis, will conduct a series of new expeditions over the next several years in an attempt to answer questions about the Lost Fleet of Columbus and other underwater sites.

- Explain to students that they will be working in groups to identify an archaeological mystery to explore and to plan an expedition to research their mystery.
- Ask students to discuss the term "expedition." What is an archaeological expedition?
- Explain that an expedition is a journey undertaken for a specific purpose. In the case of archaeology, that journey's purpose has to do with uncovering clues to answer questions about the human past.

### Explore

- Divide the students into groups and explain that the first step in developing their archaeological expedition proposal is determining what it is they want to know more about.
- Have students begin to research archaeological mysteries they would like to explore.
- Encourage students to use a variety of resources for this research, including any of the books in the investigation stations, books on general archaeology and/or history, as well as resources on the Web. Note: Students should be sure to use reputable resources, such as *Kids Discover*, *Archaeology*, and *Dig* magazines, or books from reputable publishing houses.
- Once groups have picked a topic, or site, for their investigation, they must phrase a question to direct their research. What is it that they want to know?
- Distribute the proposal form handout on page 75 and have groups fill in the Guiding Question.
- Next, each group should answer the following question: Why is your proposed research important? Students should record the answer on the proposal form.

- Remind students that they are competing against other would-be archaeologists, so it is important to make their proposal as persuasive as possible to make it appealing to the judges.

### Grades 3–5 Academic Standards

#### National Standards

**Social Studies** — Standard II: Time, Continuity & Change

**Visual Arts** — Standard 4:

Understanding the visual arts in relation to history and cultures (a, b); Standard 6: Making connections between visual arts and other disciplines (b)

#### National Common Core State Standards

**English Language Arts** — 3.W.2, 3.W.4, 3.W.7, 3.W.10, 3.L.1, 3.L.2, 3.SL.1; 4.W.2, 4.W.4, 4.W.7, 4.W.10, 4.L.1, 4.L.2, 4.SL.1; 5.W.2, 5.W.4, 5.W.7, 5.W.10, 5.L.1, 5.L.2, 5.SL.1

#### Indiana Academic Standards

**Visual Arts** — 3.1.2, 3.1.3, 3.8.2; 4.2.1, 4.8.1

### Grades 6–8 Academic Standards

#### National Standards

**Social Studies** — Standard II: Time, Continuity & Change

**Visual Arts** — Standard 4:

Understanding the visual arts in relation to history and cultures (a, b); Standard 6: Making connections between visual arts and other disciplines (b)

#### National Common Core State Standards

**English Language Arts** — 6.W.1, 6.W.4, 6.W.7, 6.W.10, 6.L.1, 6.L.2, 6.SL.1; 7.W.1, 7.W.4, 7.W.7, 7.W.10, 7.L.1, 7.L.2, 7.SL.1; 8.W.1, 8.W.4, 8.W.7, 8.W.10, 8.L.1, 8.L.2, 8.SL.1

#### Indiana Academic Standards

**Visual Arts** — 6.1.2; 7.1.1, 7.2.1, 7.2.2, 7.3.2; 8.1.1

**Social Studies** — 6.3.11

## LESSON THREE

### Dig Deeper

- Once groups have their guiding question, it is time to conduct additional research on their topic. Research is perhaps one of the most important jobs of an archaeologist. Before going into the field, it is important for an archaeologist to know all he or she can about the subject under investigation.
- Each student should be responsible for taking notes on his or her individual portion of the group research. These notes can be recorded in students' Treasures Classroom Notebooks.
- Groups should prepare a single report on their topic of choice. What information is known already? What information would be useful to know?
- Some questions to consider: What is the time period of their site? Who were the people involved? What is known about the culture? What kind of previous archaeological research has been conducted there? What information has been uncovered by this research? What kinds of artifacts have been found at the site in the past and what might they expect to find?
- These reports are intended as supporting documentation to be submitted with their proposals and, as professional documents, should conform to all appropriate standard writing conventions and cite all references used.

### Investigate

- Explain to students that it is now time to plan the expedition itself.
- Students should plan each phase of their expedition and include everything that they will need to conduct their research. The cost of all of these materials and resources

would have to be covered by grant funding.

- Encourage students to reflect on everything they have learned about archaeology throughout this unit of study and, in their groups, brainstorm what some of the challenges may be in conducting their research. They should think of solutions to these challenges.
- Groups should create a list of things they will need to include in order to conduct their research.
- Circulate among the groups and offer suggestions when appropriate. Some questions to consider: What kind of site do they intend to research? Is it a terrestrial or marine archaeology site? What types of tools are appropriate for the work they intend to do? What kind of additional specialists will they need to hire (for example: linguists, geologists, divers, or botanists)? How will they get to their site? Where will they stay while they are there? Are there hotels? Will they need to camp? How many nights? What food will they need?
- Finally, have students consider what they intend to do with any knowledge that they acquire from their expedition. Whatever they learn is only worthwhile if they share their results with others.
- Once groups have completed their proposals, it is time to present them to the audience, who will judge which proposal receives "funding."
- All members of the group should participate in the presentation, speaking clearly and at an appropriate pace.
- Groups should report on their proposed expeditions, including a synopsis of what they learned about their site through their research. Encourage students to use visual aids to enhance their presentations, such

as maps or images of artifacts related to the site.

- After all groups have had a chance to report on their proposals, allow the judges time to decide on the winning proposal, either through discussion or by casting ballots.

### Scoring Criteria

After completing the activities in the Culminating Experience, each student will be evaluated on the ability to apply what he or she has learned about archaeology from the three sites featured in the exhibit *National Geographic Treasures of the Earth* to a proposal for conducting future archaeological excavations at the site of their choice. Students should be assessed individually and as groups. Students should be able to:

- Identify a site worth further exploration
- Articulate a driving question to direct their proposed research
- Conduct research on the site of their choice
- Identify a wide range of activities and resources required for archaeological research
- Correctly identify the appropriate tools required to conduct research at their chosen site
- Demonstrate research through note taking
- Write a report using grade-level-appropriate standard conventions of writing and topic-appropriate vocabulary
- Use and cite a variety of resources to research the topic
- Use listening and speaking skills to communicate ideas effectively
- Show respect for other students

## Scoring Rubric

### Remedial

The group does not identify an appropriate archaeological site and/or articulate a driving question to guide their research. The group may fail to research the site of their choice and/or does so in a minimal way. Group members' notebooks demonstrate a lack of note taking during the research phase. The group generates a report that does not demonstrate grade-level-appropriate standard conventions of writing, with misspellings, improper grammar and/or punctuation, and/or improper sentence structure. The group fails to consider the basic needs of their expedition or makes inappropriate suggestions for resources they will require, such as planning to take diving equipment to research a terrestrial site. The group proposal does not reflect an understanding of archaeological concepts or vocabulary and fails to cite their sources in their report. Groups report their work to the audience, but may fail to speak clearly or loudly enough or face the audience. The proposal is not persuasive and the value of the research is questionable. Group members may not listen respectfully when other groups are reporting.

### Partial

The group does identify a driving question, but it may not be completely appropriate for the site they have chosen. Group members' notebooks demonstrate some note taking during the research phase, but these notes may not be detailed. The group generates a report that does not completely demonstrate grade-level-appropriate standard conventions of writing, with some misspellings, improper grammar and/or punctuation, and/or improper sentence structure. The group attempts to generate a list of tools and resources needed for their expedition, but the list has obvious

missing components. The group proposal does reflect some understanding of archaeological concepts and vocabulary but fails to cite their sources in their report. Groups report their work to the audience, speaking clearly and loudly enough but may fail to face the audience. There is an effort to make the proposal persuasive, but the value of the research is unclear. Group members may require prompting to listen respectfully when other groups are reporting.

### Essential

The group does identify a driving question that is appropriate for the site they have chosen, but it may lack detailed focus. Group members' notebooks demonstrate detailed note taking during the research phase, though they may be disorganized. The group generates a report that mostly demonstrates grade-level-appropriate standard conventions of writing, but may have a few minor errors, though no errors that make it difficult to read their report. The group attempts to create a list of necessary tools and resources required for the expedition at the site of their choice, though they may overlook a few issues that would need to be addressed on a real expedition, such as where the expedition members would sleep or what they would eat. The group proposal does reflect an understanding of archaeological concepts and vocabulary. The group cites their sources in their report. Groups report their work to the audience, speaking clearly and loudly enough and making eye contact with the audience. The proposal is clearly intended to be persuasive, leading the audience to believe the research might be valuable. Group members listen respectfully when other groups are reporting.

### Exceptional

The group identifies a driving question to guide their archaeological research plan, which is appropriate and detailed. Group members' notebooks demonstrate detailed and well-organized note taking during the research phase. The group generates a revised report that demonstrates grade-level-appropriate standard conventions of writing, with few or no misspellings or other errors. The group creates a thorough list of necessary tools and resources that accounts for most or all of the issues involved in mounting an expedition, including such things as where the participants will sleep and what they will eat. The group proposal reflects an understanding of archaeological concepts and vocabulary. The group cites their sources in their report. Groups report their work to the class, speaking clearly and loudly enough and making eye contact with the audience. The proposal is persuasive and engaging, convincing the audience of the value of the research. Group members listen respectfully when other groups are reporting and ask thoughtful questions of other groups at the appropriate time.

**LESSON THREE**

Student Handout

**Map of Catalina**





Student Handout

**Excavating Underwater**

The Challenge: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Identify the Problem: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Which tool do you think will work the best? \_\_\_\_\_  
Why? \_\_\_\_\_  
\_\_\_\_\_

**Track experiment results**

TOOL	RESULTS

**Conclusion**

Did you guess correctly? \_\_\_\_\_  
Why or why not? \_\_\_\_\_  
\_\_\_\_\_

## LESSON THREE

### Student Handout

## Artifact History

What is it? \_\_\_\_\_

Describe your artifact: \_\_\_\_\_

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**HOW WAS THIS  
OBJECT USED?**

**WHAT IS THE HISTORY  
OF THIS OBJECT?**

List your resources:

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## Student Handout

**Expedition Proposal Form**

Expedition Team Members: \_\_\_\_\_

What site do you intend to research? \_\_\_\_\_

When was this site occupied? \_\_\_\_\_

Who occupied this site? \_\_\_\_\_

Guiding Question of your research: \_\_\_\_\_

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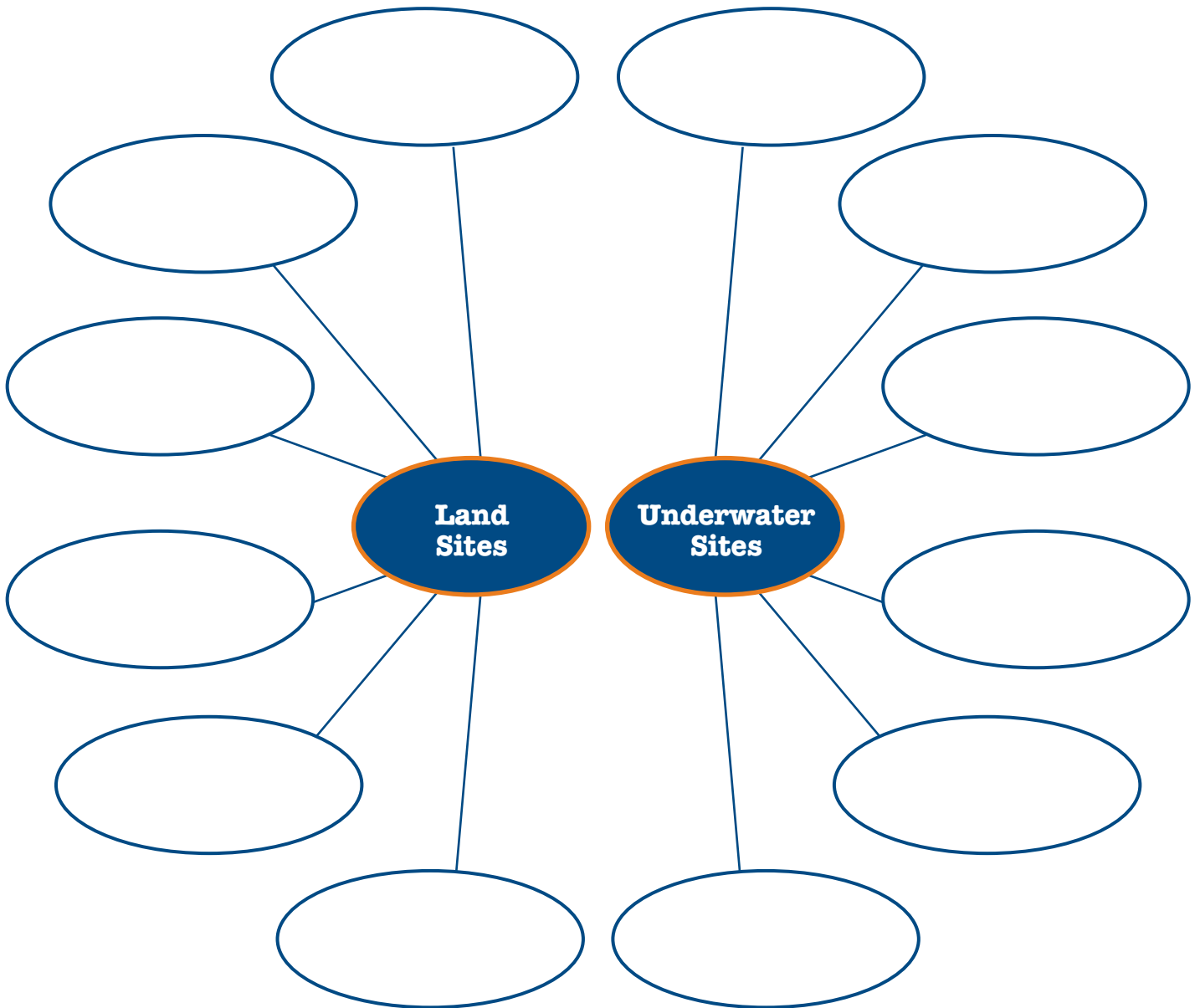
Why is your research important?

On separate pieces of paper, write down:

1. Your research on the site's history
2. Past archaeological work at the site
3. Expedition plan

Attach these pages to this Expedition Proposal Form

**Graphic Organizer — Archaeology Sites**



**archaeologist:** A scientist who searches for clues about the past by uncovering, investigating, interpreting, and preserving the sites and artifacts people left behind.

**archaeology:** The study of the past through the sites and artifacts people left behind.

**artifact:** Any object made, used, or modified by human beings.

**attributes:** Describable characteristics of an artifact.

**cartouche:** A symbol consisting of an elongated oval with a horizontal line at one end, which indicates that the hieroglyphs inside the oval represent a pharaoh's birth or throne name.

**concretions:** Rock-like mineral deposits on artifacts, particularly those made of metals, found on the ocean floor.

**corrosion:** Chemical action, such as the oxidation or rusting of a metal, that causes erosion or disintegration of artifacts.

**current:** The flow of water as influenced by gravity.

**datum point:** A fixed reference point used to record the position of objects found at an excavation site.

**emperor:** The male ruler of an empire.

**evidence:** Data, such as that obtained from artifacts or features, that can support, prove, or disprove a hypothesis.

**excavate:** The process of methodically digging to unearth artifacts and features in order to learn about the past.

**excavation:** The area which has been or is being dug up for archaeological research.

**features:** Fixed elements in an archaeological site, such as a hearth or post hole, that cannot be removed without being destroyed.

**hemisphere:** One-half the earth's surface, divided north and south or east and west.

**hieroglyphics:** A system of writing using picture symbols to represent the words and sounds of spoken language.

**hieroglyphs:** The picture symbols used in some writing systems to represent words and sounds, such as in ancient Egypt.

**hypothesis:** A testable assumption about an observable phenomenon or scientific problem. A hypothesis can be adapted or discarded in light of further archaeological evidence.

**in situ:** Something that is in its original position, not having been moved from where it was found.

**inference:** A conclusion based on evidence.

**interpret:** To explain or tell the meaning of something.

**latitude:** The angular distance north or south of the earth's equator, expressed in degrees.

**longitude:** The angle of a location on the earth's surface, expressed in degrees east or west of the Greenwich Meridian.

**marine:** Relating to or taking place in water.

**material culture:** Physical objects created by humans, such as art, jewelry, tools, food, clothes, and furniture.

**misconception:** An incorrect idea based on faulty logic or understanding.

**observations:** Facts learned by making and recording a measurement; interpretations based on those measurements.

**pharaoh:** Honorary title given to kings in ancient Egypt.

**phonetic:** Letters and symbols representing how speech sounds.

**pirate:** A person who attacks and robs ships without authorization from a sovereign nation.

**privateer:** A person or privately owned warship authorized by a government to attack enemy ships and rob them of their cargo; an officer or crew member of such a warship.

**probability:** The measure of how likely it is that a theory is or was true.

**profile:** The layers of deposits exposed on the side of an excavation site that give clues to the time line of events in that area.

**sculpture:** A three-dimensional (3D) artwork created by shaping or combining various media, including clay, wood, rock, glass, wire, plastic, or other materials.

**stereotype:** The generalized attribution of individual characteristics to an entire category of objects or people without allowing for differences.

**terra cotta:** Baked but unglazed brownish-red clay pottery.

**terrestrial:** Relating to or taking place on land.

**theory:** A possible explanation for events that can be tested for accuracy.

## Books for Students

### ARCHAEOLOGY

Grades 3–5

**Duke, Kate. *Archaeologists Dig for Clues*. New York: HarperCollins, 1997.**

An archaeologist, Sophie, invites a group of elementary school children to participate in an archaeological excavation. Simple wording and colorful illustrations provide the reader with an overview of basic land excavation and lab techniques.

**Higginson, Mel. *Scientists Who Study Ancient Temples and Tombs*. Vero Beach, FL: Rourke Corp., 1994.**

This simple, easy-to-read book provides basic information on what an archaeologist does and includes overviews of the basic types of archaeologists (e.g., bio, marine). The book also explains what archaeologists learn from artifacts and the training it takes to become an archaeologist.

**Gillespie, Lisa J. *Digging Up History*. Tulsa, OK: EDC Publishing, 2010.**

Here is a brief and simple overview of the role that archaeologists play in discovering the past. Sites in Egypt, China, Italy, and Greece (among others) are included to illustrate the whys and hows of archaeology. The text also includes descriptions of important preservation techniques.

Grades 6–8

**Bahn, Paul. *Archaeology: A Very Short Introduction*. New York: Oxford University Press, 2000.**

This book provides an overview of the history and evolution of archaeology, discusses what archaeologists do and do not do, and covers many other relevant topics, including the political and ethical issues surrounding the discipline. Technological and methodological information is also included.

**Cerullo, Mary M. *Shipwrecks: Exploring Sunken Cities Beneath the Sea*. New York: Dutton Children's Books, 2009.**

This excellent overview of the multidisciplinary nature of marine archaeology provides a summary of the special archaeological techniques required for excavating shipwrecks. It also gives information about the other professionals who are necessary for successful marine exploration, including oceanographers, biologists, historians, and collection specialists. In addition, it explores the ethical issues involved in excavating shipwrecks.

**Wheatley, Abigail. *The Usborne Introduction to Archaeology*. London: Usborne, 2008.**

This book provides background information on archaeological techniques, including a brief history of archaeology as a science, ethical concerns, threats to archaeological sites, an overview of common artifacts, and piecing the evidence together. Several archaeological sites from around the world are discussed. The book includes a section on underwater archaeology techniques.

### SETI, PHAROAHS, ANCIENT EGYPT

Grades 3–5

**Hartland, Jessie. *How the Sphinx Got to the Museum*. Maplewood, NJ: Blue Apple Books, 2010.**

Colorful illustrations and an easy-to-follow story make this book a great read-aloud story for younger school children. The author gives an introduction to the processes behind the scenes that bring objects into the museum, beginning with the commissioning of the sphinx by Pharaoh Hatshepsut, to its archaeological discovery and the subsequent release of the sphinx by the Egyptian government, to its journey across the ocean and into the Metropolitan Museum of Art.

**Kennett, David. *Pharaoh: Life and Afterlife of a God*. New York: Walker & Co., 2008.**

*Pharaoh* gives an excellent overview of the role of pharaohs in ancient Egypt, and is one of the few children's books available with a focus on Seti I. Colorful illustrations accompany the text as the book outlines the myths of Pharaoh's ascension to the afterlife and citizens' roles and responsibilities to their leader and country. The book also provides information on the livelihood of everyday workers and the economy of ancient Egypt.

**Logan, Claudia. *The 5,000-Year-Old Puzzle: Solving a Mystery of Ancient Egypt*. New York: Farrar Straus Giroux, 2002.**

A boy named Will joins a 1920 archaeological dig. Photographs from an actual site in Egypt show what is involved in an excavation.

**Weatherill, Sue, and Steve Weatherill.** *Egyptian Activity Book.* Hauppauge, NY: Barron's Educational Series, 2006.

An activity book primarily designed for younger students, this provides simple, inexpensive projects suitable for home or classroom. A brief table of hieroglyphs and a hieroglyph stencil sheet also are included.

**Woud, Nick.** *The Scarab's Secret.* New York: Walker, 2006.

Khepri the scarab beetle describes his fateful encounter with the Pharaoh. Through this encounter, young readers learn background information about the pharaohs of ancient Egypt. The book is beautifully illustrated and has simple wording, and the story line is easy to follow.

#### Grades 6–8

**Millard, Anne.** *The World of the Pharaoh.* New York: Peter Bedrick Books, 1998.

The author, an Egyptologist, created this book to provide students with details about the lives of the Egyptian pharaohs. Instead of focusing on only one or two prominent pharaohs, Millard gives an overview and timeline of the rulers of ancient Egypt, from the Pre-Dynastic period through the rule of Cleopatra VII. Some of the themes include: how a pharaoh is chosen; the ritual tasks of the pharaoh; the government, gods, and culture of ancient Egypt; and architecture and artifacts, including their purpose and meaning. This book provides an excellent overview for the amateur Egyptologist.

**Fletcher, Joann.** *Exploring the Life, Myth, and Art of Ancient Egypt.* New York: Rosen, 2010.

An up-to-date book by an academic Egyptologist, this book provides detailed descriptions of ancient Egypt, including culture, symbols, economy, art, and architecture. The author also gives the reader several brief synopses of some mythological tales that formed the basis of much of ancient Egypt's religion, ceremonies, and rites.

**Dell, Pamela.** *Hatshepsut: Egypt's First Female Pharaoh.* Minneapolis, MN: Compass Point Books, 2009.

Hatshepsut is an intriguing figure in ancient Egypt, and new information about her birth, life, rise to power, rule, and death is still being discovered. *Hatshepsut* offers the reader much of the current knowledge available and explains how this information was discovered, interpreted, and reinterpreted with new findings. In addition, the book provides insight into the lives of ancient Egyptian royal women, and describes many of the ongoing controversies surrounding the life and times of Egypt's first female pharaoh.

## HIEROGLYPHS

#### Grades 3–5

**Kamrin, Janice.** *Hieroglyphs for Children.* Cairo: Nahdet Misr Publishing and Printing, 2008.

This book provides a basic overview of ancient Egyptian hieroglyphic writing as well as child-friendly exercises. Students who want to learn more about hieroglyphs may enjoy working independently with this book.

#### Grades 6–8

**Katan, Norma Jean.** *Hieroglyphs: The Writing of Ancient Egypt.* New York: Atheneum, 1984.

This is an introduction to and primer for reading and writing Egyptian hieroglyphics—a good reference for teachers and students who want to learn more about the ancient Egyptian writing system.

## IMPERIAL CHINA

#### Grades 3–5

**Minnis, Ivan.** *You Are in Ancient China.* Chicago: Raintree, 2005.

This book places the reader in ancient China, providing an overview of the culture, rulers, and people of the time. Illustrations and photographs of ancient architecture and artifacts provide excellent visual context.

**Patent, Dorothy H.** *The Incredible Story of China's Buried Warriors.* New York: Benchmark Books, 2000.

Colorful photographs and illustrations of China's first emperor, the discovery of the Terra Cotta Warriors, and the ongoing archaeological excavations are detailed in this book. The author provides context and information about how archaeologists use artifacts to draw conclusions about past cultures. While the reading level may be too difficult for younger students, the photographs will help in understanding the fascinating story of the Terra Cotta Warriors.

**O'Connor, Jane. *Hidden Army: Clay Soldiers of Ancient China*. New York: Penguin Young Readers, 2011.**

An easy-to-read book for younger students, *Hidden Army* provides a brief synopsis of the life of China's first emperor, the discovery of the Terra Cotta Warriors, and the continuing archaeological excavations. The book also gives information about the creation of the figures, their unique characteristics, and modern attempts to recreate copies of the soldiers. Colorful photographs and illustrations provide rich detail and context.

**Grades 6–8**

**Ball, Jacqueline A., and Richard Levey. *Ancient China: Archaeology Unlocks the Secrets of China's Past*. Washington, D.C.: National Geographic, 2007.**

This book illustrates the techniques archaeologists use to study history. It focuses on ancient China and the work that has taken place there in recent years. Colorful photographs, illustrations, and time lines give the reader an excellent context for the role that archaeologists have played in gathering detailed information about China's past.

**Capek, Michael. *Emperor Qin's Terra Cotta Army: Unearthing Ancient Worlds*. Minneapolis, MN: Twenty-First Century Books, 2008.**

Here is a detailed overview of the accidental discovery and archaeological excavation of the Terra Cotta Warriors. It combines many aspects of archaeological work, including problem solving, politics, technique, and artifact studies, and includes some of the history of ancient China and explanations of how the Terra Cotta Warriors came to be.

**Cotterell, Arthur. *Ancient China*. New York: DK Publishing, 2005.**

This Eyewitness series title offers the reader insight into the culture of ancient China and includes descriptions of inventions still utilized today. The text is accompanied by detailed and colorful artwork as well as photographs of ancient Chinese artifacts, architecture, and landscape.

## CAPTAIN KIDD / PIRATES

**Grades 3–5**

**Weintraub, Aileen. *Captain Kidd: Seventeenth-Century Pirate of the Indian Ocean and African Coast*. New York: Rosen Publishing Group, 2005.**

*Captain Kidd* gives a simple overview of the events leading up to the charges against the legendary seaman, his trial, execution, and subsequent search for his "treasure." The text provides some information about why there are doubts that Captain Kidd was truly guilty of piracy.

**MacDonald, Fiona. *Top 10 Worst Nasty Pirates You Wouldn't Want to Meet!* New York: Gareth Stevens, 2011.**

Don't let the name fool you: this book doesn't glamorize pirates but offers balanced (yet fun) historical evidence about 10 of the world's most notorious pirates and privateers, including Captain Kidd. Definitions of common pirate lingo are provided, along with interesting facts.

**Osborne, Will, and Mary Pope Osborne. *Pirates*. New York: Random House, 2001.**

*Pirates* gives the young reader an overview of historical pirates, separating fact from fiction and folklore. It also discusses the origins of popular pirate tales and how historians and archaeologists decide which parts are real and which are myth.

**Grades 6–8**

**Lock, Deborah. *Pirate*. New York: DK Publishing, 2005.**

This book gives a history of pirates from ancient times to the modern day. Definitions of the different types of pirates (including those, like Captain Kidd, whose piracy is debatable), common terms, and maps of popular trading and pirate routes are provided throughout the book. To provide additional context, *Pirate* contains sketches, photographs, maps, and copies of well-known artworks.

**Rose, Jamaica, and Michael MacLeod. *The Book of Pirates: A Guide to Plundering, Pillaging, and Other Pursuits*. Layton, UT: Gibbs Smith, 2010.**

An entertaining and humorous learning adventure, *The Book of Pirates* provides a wealth of information and activities. The book encourages the reader to search for clues and separate fact from fiction. The authors explain how many pirate legends came to be, and present real pirates as the historical and archaeological records reflect them. Throughout the book, fun yet simple activities are included to give readers the chance to dress, talk, act, and eat like a pirate.



**Yolen, Jane. *Sea Queens: Women Pirates Around the World*. Watertown, MA: Charlesbridge, 2008.**

Here are written accounts of legendary female pirates from history. The author includes evidence that speaks to whether the pirates in question were historical or fictional characters. The book also includes mystery and historical context, which allows young readers to weigh the evidence and decide for themselves.

## Books for Teachers

**Kaplan, Sandra, and Bette Gould.**

***Frames: Differentiating the Core Curriculum*. Calabasas, CA: Educator to Educator, 1998.**

Kaplan provides numerous graphic organizers that enable students to explore topics more deeply, develop thinking and language skills, and organize ideas. Numerous organizers or “frames” provided can be adapted to a wide variety of classroom uses.

Many of the books listed for students are also good teacher references, including:

### Archaeology

- Bahn, Paul. *Archaeology: A Very Short Introduction*.
- Cerullo, Mary M. *Shipwrecks: Exploring Sunken Cities Beneath the Sea*.
- Wheatley, Abigail. *The Usborne Introduction to Archaeology*.

### Ancient Egypt

- Dell, Pamela. *Hatshepsut: Egypt's First Female Pharaoh*.
- Fletcher, Joann. *Exploring the Life, Myth, and Art of Ancient Egypt*.
- Kennett, David. *Pharaoh: Life and Afterlife of a God*.
- Kamrin, Janice. *Hieroglyphs for Children*.

- Katan, Norma Jean. *Hieroglyphs: The Writing of Ancient Egypt*.

- Millard, Anne. *The World of the Pharaoh*.

### Imperial China

- Ball, Jacqueline A, and Richard Levey. *Ancient China: Archaeology Unlocks the Secrets of China's Past*.
- Capek, Michael. *Emperor Qin's Terra Cotta Army: Unearthing Ancient Worlds*.
- Cotterell, Arthur. *Ancient China*.
- Patent, Dorothy H. *The Incredible Story of China's Buried Warriors*.

### Captain Kidd/Piracy

- Rose, Jamaica, and Michael MacLeod. *The Book of Pirates: A Guide to Plundering, Pillaging, and Other Pursuits*.
- Osborne, Will, and Mary Osborne. *Pirates*.

## Websites

### Archaeology

#### National Park Service: Archeology for Kids

[nps.gov/archeology/public/kids/index.htm](https://nps.gov/archeology/public/kids/index.htm)

This site provides a good introduction to the study of archaeology, designed for kids. It provides an overview of what archaeologists do, the different types of specialists involved in the field, and some of the techniques involved.

#### Dig: The Archaeology Magazine for Kids

[digonsite.com/](https://digonsite.com/)

The official website for the magazine *Dig*, this is a great resource for kids interested in a variety of topics in archaeology and ancient history. It includes quizzes, fun facts, a glossary of terms, and the “Ask Dr. Dig” feature, where kids can submit questions to be answered by a real archaeologist. It also provides information on ordering back issues of the magazine.

### Ancient Egypt

#### Absolute Egyptology

[nemo.nu/ibisportal/0egyptintro/](https://nemo.nu/ibisportal/0egyptintro/)

This is a child-friendly website with information on many aspects of Egyptology, including geography, definitions of the different kingdoms and dynasties, current study, religion, and language. It also includes colorful illustrations, games, and links to other resources.

#### The Theban Mapping Project

[thebanmappingproject.com/](https://thebanmappingproject.com/)

This site is an excellent source of information about the Valley of the Kings, including maps, images, and detailed information about each tomb. It also links to a variety of additional resources on ancient Egypt.

### Terra Cotta Warriors

#### The Terra-Cotta Army of Emperor Qin

[highlightskids.com/Stories/NonFiction/NF1298\\_terracotta.asp](https://highlightskids.com/Stories/NonFiction/NF1298_terracotta.asp)

This site provides a brief overview of the Qin Dynasty and the discovery of the Terra Cotta Warriors, including a few pictures and context.

# RESOURCES

## The Cutest Terra Cotta Warrior Ever

[youtube.com/watch?v=OmtbHR\\_IrqA](https://www.youtube.com/watch?v=OmtbHR_IrqA)

In preparation for an exhibit on the Terra Cotta Warriors due to open in Washington, D.C., National Geographic sent a living “Terra Cotta Warrior” onto the streets of the city. In this video clip, a particularly courageous little girl walks up to greet the “warrior.”

## Movies

The following list of films offer representations of archaeology that contribute to the popular image of the discipline. These films do not offer an accurate representation of archaeologists or their work, but they can inspire an interest in archaeological exploration in students. These films are also useful as a “jumping off” point for further discussion about the differences between archaeology in fiction and in reality.

- *Indiana Jones and the Raiders of the Lost Ark*
- *Indiana Jones and the Temple of Doom*
- *Indiana Jones and the Last Crusade*
- *Indiana Jones and the Kingdom of the Crystal Skulls*
- *Lara Croft: Tomb Raider*
- *Lara Croft Tomb Raider: Cradle of Life*
- *The Mummy*
- *The Mummy Returns*
- *The Mummy: Tomb of the Dragon Emperor*

Archaeology Dos and Don'ts	
What an archaeologist does	What an archaeologist <b>does not do</b>
● Studies people of the past	● Studies animals (unless they were used for food or as pets)
● Searches for clues that humans left behind	● Searches for dinosaur bones
● Excavates and studies archeological sites	● Digs for buried treasure
● Examines material culture (objects that were made, used or altered by humans)	● Studies animal or plant fossils
● Carefully documents contents of graves and often reburies human remains.	● Robs graves
● Researches a potential archaeological site carefully before digging	● Looks for adventure and digs based on legends
● Receives permission from the proper authorities before beginning a dig	● Digs and take artifacts without getting permission
● Maps sites so that it is clear where artifacts were found	● Digs without documentation
● Digs systematically, recording when, where, and how artifacts were found	● Digs holes and takes cool stuff
● Takes artifacts to a lab where they are cleaned and studied	● Takes artifacts home
● Writes reports on the excavation, drawing conclusions based on material evidence	● Spends all his or her time digging
● Shares research and artifacts with other archaeologists, students, the public, and museums	● Keeps artifacts to sell or for their own personal collection
● Works with other professionals (like geologists, historians, botanists, linguists, etc.) in order to “see the whole picture”	● Works alone and in secret so that no one else will steal his or her “stuff”

## Grades 3–5 Academic Standards

## National Standards

## Social Studies

Standard I: Culture

Standard II: Time, Continuity & Change

Standard III: People, Places & Environments

## Visual Arts

Standard 4: Understanding the visual arts in relation to history and cultures (a, b)

Standard 6: Making connections between visual arts and other disciplines (b)

## Geography

Standard 1: How to Use Maps and Other Geographic Representations, Tools, and Technologies to Acquire, Process, and Report Information from a Spatial Perspective

## National Common Core State Standards

## Grade 3

## English Language Arts

## Text Types and Purposes

3.W.1 Write opinion pieces on topics or texts, supporting a point of view with reasons.

## Production and Distribution of Writing

3.W.4 With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose.

## Research to Build and Present Knowledge

3.W.7 Conduct short research projects that build knowledge about a topic.

3.W.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

## Range of Writing

3.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

## Comprehension and Collaboration

3.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

3.SL.3 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.

## Mathematics

3.MD.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

3.OA.1 Interpret products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each.

Mathematical Practice (4) Model with mathematics.

Mathematical Practice (5) Use appropriate tools strategically.

## Grade 4

## Language Arts

## Text Types and Purposes

4.W.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer's purpose.

b. Provide reasons that are supported by facts and details.

c. Link opinion and reasons using words and phrases (e.g., for instance, in order to, in addition).

d. Provide a concluding statement or section related to the opinion presented.

## Production and Distribution of Writing

4.W.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.

## Research to Build and Present Knowledge

4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

4.W.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

## Range of Writing

4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

## Comprehension and Collaboration

4.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.

b. Follow agreed-upon rules for discussions and carry out assigned roles.

## Grades 3–5 Academic Standards

- c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
  - d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.
- 4.SL.3 Identify the reasons and evidence a speaker provides to support particular points.

### Mathematics

- 4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
- 4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
- 4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.
- 4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure:
- a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through  $\frac{1}{360}$  of a circle is called a “one-degree angle,” and can be used to measure angles.
  - b. An angle that turns through  $n$  one-degree angles is said to have an angle measure of  $n$  degrees.
- Mathematical Practice (4) Model with mathematics.
- Mathematical Practice (5) Use appropriate tools strategically.

### Grade 5

#### English Language Arts

##### Text Types and Purposes

- 5.W.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
- a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer’s purpose.
  - b. Provide logically ordered reasons that are supported by facts and details.
  - c. Link opinion and reasons using words, phrases, and clauses (e.g., consequently, specifically).
  - d. Provide a concluding statement or section related to the opinion presented.

##### Production and Distribution of Writing

- 5.W.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.

##### Research to Build and Present Knowledge

- 5.W.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- 5.W.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

##### Range of Writing

- 5.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

##### Comprehension and Collaboration

- 5.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others’

ideas and expressing their own clearly.

- a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.
- b. Follow agreed-upon rules for discussions and carry out assigned roles.
- c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.
- d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.

### Mathematics

- 5.NF.5 Interpret multiplication as scaling (resizing), by:
- a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
  - b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence  $\frac{a}{b} = \frac{(n \times a)}{(n \times b)}$  to the effect of multiplying  $\frac{a}{b}$  by 1.
- 5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
- Mathematical Practice (4) Model with mathematics.
- Mathematical Practice (5) Use appropriate tools strategically.

## Grades 3–5 Academic Standards

### Indiana Academic Standards

#### Grade 3

##### Visual Arts

- 3.1.1 Identify visual clues in works of art and artifacts that reflect characteristics of a given culture and speculate on where, when, and by whom the work was made.
- 3.1.2 Speculate on the function or purpose of a work of art and make connections to culture.
- 3.1.3 Identify themes and symbols in works of art from various cultures, ethnicities, and historical periods.
- 3.8.2 Create artwork utilizing concepts, subject matter, or the sign systems of other disciplines.

##### Science

Process Standards: The Nature of Science

Process Standards: The Design Process

##### Social Studies

- 3.3.3 The World in Spatial Terms: Identify the northern, southern, eastern and western hemispheres; cardinal and intermediate directions; and determine the direction and distance from one place to another.
- 3.3.9 Human Systems: Identify factors that make the region unique, including cultural diversity, industry, the arts and architecture.
- 3.4.2 Give examples of goods and services provided by local business and industry.

#### Grade 4

##### Visual Arts

- 4.2.1 Recognize characteristics of selected works from artists of various cultures.
- 4.8.1 Identify characteristics of a big idea, historical period, or event as found within different disciplines.

##### Science

Process Standards: The Nature of Science

Process Standards: The Design Process

- 4.1.1 Describe and investigate the different ways in which heat can be generated.

##### Social Studies

- 4.3.6 Physical Systems: Describe Indiana's landforms (lithosphere), water features (hydrosphere), and plants and animals (biosphere).
- 4.4.1 Give examples of the kinds of goods and services produced in Indiana in different historical periods.

#### Grade 5

##### Science

Process Standards: The Nature of Science

Process Standards: The Design Process

##### Social Studies

- 5.1.2 Ways of Life Before and After the Arrival of Europeans to 1610. Examine accounts of early European explorations of North America including major land and water routes, reasons for exploration and the impact the exploration had.
- 5.3.1 The World in Spatial Terms: Demonstrate that lines of latitude and longitude are measured in degrees of a circle, that places can be precisely located where these lines intersect, and that location can be stated in terms of degrees north or south of the equator and east or west of the prime meridian.

## Grades 6-8 Academic Standards

### National Standards

**Social Studies** – Standard I: Culture

**Social Studies** – Standard II: Time, Continuity & Change

**Social Studies** – Standard III: People, Places & Environments

**Visual Arts** – Standard 4:

Understanding the visual arts in relation to history and cultures (a, b);

**Visual Arts** – Standard 6: Making connections between visual arts and other disciplines (b)

**Geography** – Standard 1: How to

Use Maps and Other Geographic Representations, Tools, and Technologies to Acquire, Process, and Report Information from a Spatial Perspective

### National Common Core State Standards

#### Grade 6

#### English Language Arts

#### Text Types and Purposes

6.W.1 Write arguments to support claims with clear reasons and relevant evidence.

- Introduce claim(s) and organize the reasons and evidence clearly.
- Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.
- Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.
- Establish and maintain a formal style.
- Provide a concluding statement or section that follows from the argument presented.

#### Production and Distribution of Writing

6.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

#### Research to Build and Present Knowledge

6.W.7 Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

#### Range of Writing

6.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

#### Comprehension and Collaboration

6.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

- Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
- Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.
- Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.
- Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.

#### Mathematics

6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas  $V = lwh$  and  $V = bh$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

Mathematical Practice (4) Model with mathematics.

Mathematical Practice (5) Use appropriate tools strategically.

#### Grade 7

#### English Language Arts

#### Text Types and Purposes

7.W.1 Write arguments to support claims with clear reasons and relevant evidence.

- Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.
- Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
- Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.
- Establish and maintain a formal style.
- Provide a concluding statement or section that follows from and supports the argument presented.

#### Production and Distribution of Writing

7.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

#### Research to Build and Present Knowledge

7.W.7 Conduct short research projects to answer a question,

## Grades 6–8 Academic Standards

drawing on several sources and generating additional related, focused questions for further research and investigation.

**Range of Writing**

7.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

**Comprehension and Collaboration**

7.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

- Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
- Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.
- Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.
- Acknowledge new information expressed by others and, when warranted, modify their own views.

**Mathematics**

7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

- Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.

c. Design and use a simulation to generate frequencies for compound events.

Mathematical Practice (4) Model with mathematics.

Mathematical Practice (5) Use appropriate tools strategically.

**Grade 8****English Language Arts****Text Types and Purposes**

8.W.1 Write arguments to support claims with clear reasons and relevant evidence.

- Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
- Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
- Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.
- Establish and maintain a formal style.
- Provide a concluding statement or section that follows from and supports the argument presented.

**Production and Distribution of Writing**

8.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

**Research to Build and Present Knowledge**

8.W.7 Conduct short research projects to answer a question (including a self-generated

question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

**Range of Writing**

8.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

**Comprehension and Collaboration**

8.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

- Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
- Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.
- Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.
- Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

**Mathematics**

Mathematical Practice (4) Model with mathematics.

Mathematical Practice (5) Use appropriate tools strategically.

## Grades 6–8 Academic Standards

### Indiana Academic Standards

#### Grade 6

##### Visual Arts

6.1.2 Identify how the roles and relationships of artists and patrons have affected the creation of works of art.

##### Social Studies

6.3.1 The World in Spatial Terms: Identify and locate on maps the countries and capitals of Europe and the Americas such as Great Britain, Russia, Mexico, Canada, and Brazil.

6.3.2 The World in Spatial Terms: Use latitude and longitude to locate the capital cities of Europe and the Americas and describe the uses of locational technology, such as Global Positioning Systems (GPS) to distinguish absolute and relative location and to describe Earth's surfaces.

6.3.11 Human Systems: Define the terms anthropology and archeology and explain how these fields contribute to our understanding of societies in the present and the past.

##### Science

Process Standards: The Nature of Science

Process Standards: The Design Process

#### Grade 7

##### Visual Arts

7.1.1 Identify where, when, why, and by whom a work was made; and analyze the relationship between a work of art and the history, politics, and technology of the culture (focus: Asia, Africa, and the South Pacific).

7.2.1 Identify and be familiar with works from major periods of non-Western art identifying artist, culture, style, and aspects from the historical context.

7.2.2 Research and identify how beliefs, customs, and technology affect artists' styles of work.

7.3.2 Construct meaning and develop well-supported interpretations in works utilizing dialogue and shared peer perspectives, properties found in the work, and research-based background information.

##### Social Studies

7.1.1 Early Civilizations, States and Empires: 3500 B.C./B.C.E. to 650 A.D./C.E. Identify and compare the rise of early agricultural river valley civilizations in Africa and Asia.

7.1.2 Early Civilizations, States and Empires: 3500 B.C./B.C.E. to 650 A.D./C.E. Describe the achievements of ancient Egypt in art, architecture, religion, and government and the development of the concept of theocracy.

7.1.3 Early Civilizations, States and Empires: 3500 B.C./B.C.E. to 650 A.D./C.E. Trace steps in the development of written language, including the evolution of Sumerian cuneiform, Egyptian hieroglyphics, and Chinese calligraphy.

7.3.1 The World in Spatial Terms: Identify and locate on maps the countries of Africa, Asia and the Southwest Pacific.

##### Science

Process Standards: The Nature of Science

Process Standards: The Design Process

#### Grade 8

##### Visual Arts

8.1.1 Identify and analyze where, when, why, and by whom a work was made and the relationship of a work of art to the historical, environmental, technological, and social contexts of the culture in which it was created.

##### Science

Process Standards: The Nature of Science

Process Standards: The Design Process